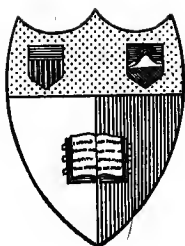


HEALTH RESORTS

DR. BURNEY YEO



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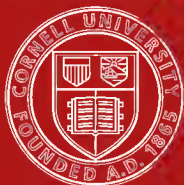
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HEALTH RESORTS

AND THEIR USES.

BEING

VACATION STUDIES IN VARIOUS HEALTH RESORTS.

BY

J. BURNEY YEO, M.D.

“Peu de maladies guérissent dans les circonstances et les lieux où elles naissent, et qui les ont faites. Elles tiennent à certaines habitudes que ses lieux perpétuent et rendent invincibles. Nulle réforme (physique ou morale) pour qui reste obstinément dans son péché originel.”—*Michelet*.

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CHARLES DICKENS AND EVANS,
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TO

DR. PHILIP FRANK,

OF CANNES,

TO WHOSE FRIENDLY COUNSEL THESE STUDIES OWE MUCH,

THEY ARE GRATEFULLY DEDICATED.

PREFACE.

THE following studies of various Health Resorts have afforded me a congenial occupation during several of my annual holidays, and have most of them appeared, from time to time, in the pages of *The Fortnightly Review* or in the columns of *The Times* newspaper.

It has often been suggested to me by those, the correctness of whose judgment I could not doubt, that they would prove of some value and usefulness if they were republished in a collected form; in adopting this suggestion I have been careful to revise all these studies thoroughly, and to rewrite parts of most of them. The chapters on the Engadine are founded on a little volume

I published in 1870, entitled "A Season at St. Moritz." This has been revised throughout, and to a great extent rewritten. It will no longer appear in a separate form.

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HEALTH RESORTS

AND THEIR USES.

CHAPTER I.

SEA OR MOUNTAIN.

A STUDY OF THE ACTION OF SEA AND MOUNTAIN AIR.

THE results of recent investigations as to the relative influence and value of sea and mountain climates as remedial and invigorating agencies are of much interest. The restorative properties of sea air have long been fully appreciated, although regular and periodical migration to the seashore is a custom of modern origin. The popularity of mountain health resorts is, however, of quite recent date, and much has still to be learnt from careful observation and experiment as to the exact nature of the influences at work in them, and the precise limits of their application.

This is not a question of narrow professional import, but it is one of those practical physiological studies upon which educated persons may desire, and may be expected, to form just and correct ideas. It is, I believe, a somewhat prevalent notion that sea and mountain air are widely different in their mode of action; that they are, as it were, the extremes of climatic influences. This, however, is not the case.

There is much that is common to both of them in their action on the human organism.

The results, indeed, of precise experimental observations on this subject are perhaps a little at variance with what we might, at first sight, have been led to anticipate. An attempt to determine experimentally the difference in the action of sea and mountain air was made by Professor Beneke, of Marburg, in 1872.* He had already established by observation and experiment, that exposure to the air of the North Sea (his observations were made in the isle of Norderney) produced an appreciable acceleration of the nutritive changes in the nitrogen-containing tissues of the human body. In more simple language, it helped us to "throw off the old man," to get rid of our old material, and to put new stuff in its place. By what precise means it led to so desirable a result he had not been able to satisfy himself. Was it the abundance of ozone in the air? Was it due to the influence of the strong reflection of light from the sea? Or was it simply a stimulating psychical effect? The phenomena observed were not sufficiently accounted for by either or all of these suggested influences. It occurred to him that he might establish some basis for a satisfactory explanation of these results, if he could ascertain the relative proportion in which bodily heat was lost, in a given time, in sea air and in inland air. Experiments on the human organism itself were of little avail for exact observations, since they must inevitably be complicated by the heat-regulating processes within it. He therefore constructed the following simple apparatus, by which the loss of heat from a heated body, under various external conditions, could be observed:

A thermometer was suspended in a glass flask, into which water at a temperature of 50 degrees Centigrade was introduced, and then it was ascertained how long,

* "*Deutsches Archiv für Klinische Medicin.*" March, 1874.

under various external conditions, it took for the water to cool from 45 to 35 degrees. The influence of clothing in interfering with the loss of heat was also tested by enveloping the flask, first with shirting, then with linen and flannel, and finally with shirting and a double layer of flannel. The observations with this apparatus were made, first in a closed room in the island of Norderney, then outside the house in the midst of the village, and then on the shore of the island; and these were compared with like observations in a closed room in Marburg, and on a terrace in the professor's garden there. All these observations gave the same result, viz. that in equal or even higher temperatures of the air, the flowing-off of heat occurred much more rapidly on the seashore than inland; a circumstance which Professor Beneke refers, first, to the high degree of saturation of sea air by moisture, and secondly, to the intensity of the currents of air on the seashore. And he infers that the beneficial influence of the North Sea air on the human organism is due, in great part, to the increased loss of heat it occasions from the surface of the body. In answer to the objection that the same effect would be produced by a cold bath or by exposure to air of a low temperature anywhere, he rightly replies that the peculiar effect of the sea air is, that it withdraws heat in a more gradual and continuous manner, that its currents gently stimulate the surface, and thus a steady restoration of the heat lost is produced without causing any great tax on the reactionary forces of the body, so that weakly persons may be exposed with perfect safety, for hours together, to this cooling, and, at the same time, reconstituting process.

The next point the professor desired to ascertain was, how the loss of heat from the apparatus described above would be affected by exposure to mountain air at different altitudes, and accordingly he made a series of observations at the following places: On the Schienige Platte, near Interlaken, 5800 feet above the sea, the temperature of the air ranging from 9.5 to

13 degrees Réaumur ; it took 91·5 minutes to produce the same loss of temperature which was brought about in 53 minutes, temperature of air 13 degrees Réaumur (in 35 minutes during a storm), on the seashore of Norderney ; on the Wengern Scheideck, 6370 feet above the sea, the temperature of the air ranging from 5 to 7 degrees Réaumur, the same amount of cooling took 68·5 minutes ; on the great Scheideck, 6036 feet, the temperature of the air ranging from 5 to 8 degrees Réaumur, 90 minutes. The next three points of observation were lower. They are well-known health resorts. On the terrace of the hotel at Bürgenstock, on the Lake of Lucerne, 2900 feet above the sea, temperature of the air 7·5 to 8·5 degrees Réaumur, the same loss of heat was produced in 73 minutes. At Engleberg, 3109 feet, temperature of air 10 to 10·5 Réaumur, it took 69·25 minutes. At Seelisberg, 2336 feet, temperature of the air 11·5 to 12·5 Réaumur, 94·5 minutes. The last observation was made on the Rigi Staffel, 5048 feet, temperature of the air 7 degrees Réaumur—a *violent storm*, he says, was raging, such as one only expects to find on the sea-coast—and the same amount of cooling took 64 minutes.

Professor Beneke thus establishes the fact that heat is lost from the selfsame apparatus more slowly on the tops of mountains than on the shore of the North Sea ; and this notwithstanding that on the tops of the mountains the temperature of the air was almost constantly lower, a circumstance which would have led us to expect a more rapid loss. He tells us also that his observations were made at times when there was a considerable amount of moisture in the air, so that the slower loss of heat could not be referred to the dryness of the air, nor to the lesser intensity of the currents, for a violent storm was blowing during the observations on the Rigi Staffel. It remains to be determined whether it is due to the rarefaction of the air—whether rarefied air is a much worse conductor of heat than air on the seashore.

These observations appear to justify the following inference: Since the activity of tissue-changes will correspond with the loss of heat, the greater the loss of heat the greater will be the activity of change of tissue, i.e. the greater the stimulus to nutritive changes. Hence in mountain air these nutritive changes are comparatively much less active than on the shore of the North Sea. And Professor Beneke's practical conclusions are that individuals in whom the processes of tissue-change do not require hastening are, *cæteris paribus*, better off on mountain heights than on the seacoast. Highly irritable, nervous organisations, people who, as we say, take too much out of themselves, profit more by mountain than by sea air. For those, on the contrary, who have no tendency to nervous irritability, and who are in a condition to bear the increased stimulus to tissue-change, sea air is a more powerful restorative agent. Hence the greater proportion of scrofulous persons and those exhausted by overwork, who retain some activity of the digestive organs, should prefer the seaside.

But although these general conclusions of Professor Beneke's are probably in the main correct, there are many other considerations to be attended to in determining the relative value, in individual instances, of sea and mountain air. I have, however, thought it advisable to call attention, at some length, to these really valuable observations and suggestions of Beneke, as they are almost the only experimental researches that have been hitherto published on this interesting and important practical question.

I shall now proceed, in the first place, to consider in detail what are those properties of sea air to which it owes its special influence on the human organism. The presence of ozone in sea air in greater proportion than in the air of inland plains is well established. This is a property which it shares with mountain air. Its greater abundance on the seacoast depends, in all probability, on the influence of sunlight, which is one of the most important sources of ozone. Vegetation

is also a source of ozone, and it is therefore found in excess in forest air ; where, therefore, we find pine-forests on the seacoast, as at Arcachon and Bournemouth, we may look for an unusual excess of this hygienic agent. Experience has thoroughly established the fact that where the amount of ozone in the air is constantly high, there we almost invariably find a high degree of salubrity. It purifies the air by destroying injurious gases, and especially by determining the oxidation of decomposing organic substances. It promotes nutrition and blood-formation by supplying to the respiratory organs a most active form of oxygen. The excess of ozone in sea air is, therefore, one of its most important properties, as it is also one of the most important properties of mountain air.

Another hygienic property which sea air shares with mountain air is the absence in it of organic dust. This applies with especial force to the air of the open sea, or on small islands, or to points of land standing well out into the sea. If people build a large town on the seacoast, which becomes densely populated, organic impurities will tend to accumulate over the thickly inhabited area ; and when the wind blows off the land such impurities may be wafted to a little distance off the coast. But as the sea presents an ever-moving fluid surface, no impurities in the shape of organic dust can rest upon it, so as to be again blown about, in mischievous activity, with every fresh breeze.

Equableness of temperature is another characteristic of sea air, and one to which it owes much of its beneficial influence in many cases. In this respect it is contrasted with the air of elevated regions, in which the diurnal variations of temperature are often very considerable. The temperature of the seacoast is warmer in winter and cooler in summer than that of inland districts. This admits of easy explanation. In the first place the rapid cooling of the surface of the land by radiation into space, after the sun has gone down, is checked by the amount of moisture in the

air. The aqueous vapour which is abundant in sea air absorbs the heat given off from the soil during nocturnal radiation, and acts as a kind of screen to retard the loss of heat in this way. Hence great variations between the day and night temperatures are very rarely observed at the seaside.

"Wherever the air is dry," says Professor Tyndall, "we are liable to daily extremes of temperature. By day, in such places, the sun's heat reaches the earth unimpeded, and renders the maximum high; by night, on the other hand, the earth's heat escapes unhindered into space, and renders the minimum low. Hence the difference between the maximum and minimum is greatest where the air is driest. In the plains of India, on the heights of the Himalaya, in Central Asia, in Australia, wherever drought reigns, we have the heat of day forcibly contrasted with the chill of night. In the Sahara itself, when the sun's rays cease to impinge on the burning soil, the temperature runs rapidly down to freezing, because there is no vapour overhead to check the calorific drain." It is a matter of common observation that, in the interior of continents, where the rainfall is small, the heat of summer and the cold of winter are greater than at or near the coast.

During the heat of the day the air over the sea is always cooler than that over the land; for the surface of the land gets rapidly heated and communicates its heat to the superjacent strata of air; but "when the sun's rays fall on water they are not, as in the case of land, arrested at the surface, but penetrate to a considerable depth," so that water is heated much more slowly by the sun's rays, as well as cooled more slowly by nocturnal radiation, than the land. Moreover, the evaporation which is always going on at the surface of the sea, and going on rapidly where the sun's rays are powerful, carries away some of the heat of the surface-water, and helps to keep the air in contact with it cool.

Much of that feeling of agreeable *freshness* in the

air at the seaside during hot weather is due to currents of air produced by this inequality in the heating and cooling of the atmosphere on the land and over the sea. As the day advances and the land becomes heated by the sun's rays, it heats the air on its surface, which thus becomes lighter and ascends, while the cooler and heavier air lying on the sea flows in to take its place, and so a refreshing sea-breeze is generated. During the night the land is rapidly cooled, especially if the night be clear, by radiation into stellar space, and the air lying on it is cooled also, and thus becomes heavier than the warmer air over the sea, and so it happens that in the morning and early part of the day a gentle breeze is found blowing off the land towards the sea.

But the influence of the sea in equalising the temperature of the air is exercised in another very interesting manner. "Over the surface of the ground slanting to the seashore the cold currents generated by radiation flow down to the sea, and the surface-water being thereby cooled sinks to lower depths. In the same way, no inconsiderable portion of the cold produced by radiation in all latitudes over the surface of the ocean and land adjoining, is conveyed from the surface to greater depths."

On account of this equableness of temperature, oceanic climates—the most equable of all climates—are said to afford almost absolute immunity from colds. It is only on board ship that such a climate in its perfection can be found. A very near approach to it, however, may be obtained on such very small islands as, for instance, the isle of Monach, about seven miles to the west of the Hebrides, and fully exposed to the prevailing westerly winds of the Atlantic. The mean January temperature of this island, which is nearly in the latitude of Inverness, is 43·4 degrees Fahrenheit, or 1·8 degree higher than the mean of January at Ventnor. On the other hand, the mean temperature of July is at Monach 55·0 degrees, and at Ventnor 62·6 degrees, so that in

January Monach is 1·8 degree warmer than Ventnor, in summer it is 7·6 degrees cooler.*

But these two characteristics of sea air—an equable temperature and a high degree of saturation with moisture—are soothing rather than bracing properties, and if it were not for the currents of air induced on the surface of the sea they might be found actually relaxing, and this is no doubt the case in warm and cloudy weather on our own south-western coasts. In these respects, therefore, sea air offers a great contrast to mountain air.

The same is the case in the next property of sea air I propose to consider, viz. its density. The absolute density of sea air is of course greater than that of the air at any higher level, and it must therefore contain bulk for bulk more oxygen, and it follows that in breathing sea air we take more oxygen into the lungs in a given time than in the air we breathe at places above the level of the sea; that is, supposing in both cases we breathe with equal frequency and equal amplitude. But it does not necessarily follow because an absolutely larger quantity of oxygen exists in a given volume of sea air than in the same volume of mountain air, that more oxygen, on that account, is taken into the blood at the seaside than on higher ground. In the first place, the oxygen may be, for aught we know, in a more active form in mountain than in sea air; its chemical energy may be greater, and therefore the nutritive changes dependent on respiration may be accelerated, though the air be thinner and poorer in its absolute quantity of oxygen; or, in the second place, the respiratory act may be so much increased in frequency on the mountains, that although less oxygen is taken into the lungs at each breath, yet much more may be received into the organism in a given time. Moreover, if we compare the density of sea air with the

* See article "Climate," in the new edition of the "Encyclopædia Britannica."

density of the air inland, at places situated only a few feet above the sea level, as, for instance the greater part of London, the difference would be so insignificant as really to merit very little consideration.

But disregarding, for the present, the absolute density of sea air, a more important point to be attended to is the great and frequent variations of barometric pressure met with on the sea and on sea-coasts. Now it has been shown by careful experiment that all rapid variations in atmospheric pressure increase the activity of the circulating and respiratory organs, and that the perfection of organic life depends on these alternations of excitement and repose. We are justified, then, in assuming that rapid changes in the barometric pressure are more favourable to vital functional activity than its relative stability.

It has also been shown that the barometric variations at the seaside, besides being greater in amount than inland, occur with far more regularity, a circumstance which is regarded as tending to promote the accommodation of the organism to its new conditions.

These, then, are the most important properties of sea air: 1, excess of ozone; 2, excess of aqueous vapour and equability of temperature; 3, great purity and absence of organic particles; 4, maximum density and great but regular variations of barometric pressure. Of minor importance are the presence of saline particles suspended in the air, which, of course, vary greatly in amount, according as the sea is calm or agitated, and probably exercise a mildly stimulating effect on the respiratory mucous membrane. The small amount of iodine and bromine diffused in sea air may not be without a real influence on some organisms.

Leaving, for the present, any further investigations into the effects of sea air and its usual concomitant sea-bathing, I propose in the next place to examine, also in detail, the characteristic properties of mountain air. And here, at the very outset of our inquiry,

we come upon a very remarkable contrast. There was no need to define what we meant by sea air, although its effects, as I shall have to point out hereafter, may be greatly modified by circumstances of locality. But are we always sure what we mean when we use the term mountain air? In Scotland and Wales we speak of mountain air at a few hundred feet above the sea, considerably below the level of the towns of Lucerne or Geneva. In Germany we hear of mountain air at 1200 and 1500 feet above the sea, and in the Engadine at 6000 feet, in Mexico at 12,000! Now if we think only of one quality of mountain air, viz. its rarefaction, it is quite clear that we must be using the same term to express very different things. But if we are thinking only of the *general* bracing effects of mountain air we may find these, no doubt, at very various elevations, and we may even find them in great perfection at comparatively low levels. An open plateau in a temperate climate at an elevation of 2000 or 3000 feet above the sea will certainly possess a more bracing air than a close valley in a hot climate at twice that height. But what shall we say when a Scotch medical man tells us that "the air of Strathpeffer and of the Engadine are much the same!" They may indeed be as "much the same" as air at 200 feet and air at 6000 feet above the sea level can be.

If we confine our attention to the continent of Europe we may take the Upper Engadine (about 6000 feet) as the extreme limit of a permanently inhabited, and perhaps habitable, mountain district. (The village of Cresta in the Aversthal, 6295 feet above the sea, is reckoned the *highest* in Europe.) The Hon. Lionel Tollemache, in an article in the "Fortnightly Review," has advocated the salubrity of a residence at a considerably higher level, viz. on the Bernina Pass, at 7658 feet above the sea. But for all practical purposes of comparison we may take an elevation of 6000 feet as the limit in one direction of a habitable European mountain climate, and in the other direction

such elevations as Heiden, above the Lake of Constance, 2660 feet; Glion, above Montreux, 2900 feet; and Seelisberg, 2400 feet, on the Lake of Lucerne. Places at a lower elevation than these, although they may have many advantages as health resorts, can scarcely be admitted into the category of mountain climates. Of localities such as these, then, ranging between 2000 and 6000 feet above the sea level, we have, within tolerably easy access, a great number to choose from; while there are a few, for exceptional needs and for short periods of residence, between 6000 and 8000 feet.

There seems good reason to believe, as I shall hope to show presently, that at higher elevations than these the air reaches a degree of rarefaction which is inconsistent with the maintenance of vigorous health. So that those who have sought health and vigour at such elevations as the Bernina should be content with the motto *In excelsis* rather than *Excelsior*!

Diminution of atmospheric pressure is, then, one of the chief properties of mountain air, and the relative proportions of this diminution must necessarily, *cæteris paribus*, have much to do in determining the hygienic character of any particular mountain station and its suitability to different individuals. It has been calculated that at an elevation of 2500 feet we lose about one-eighth of the atmospheric pressure, at 5000 a sixth, at 7500 feet a fourth, and at 16,000 a half.

Another important property of mountain air is its lower temperature. It is a very well known fact that the temperature of the air diminishes in proportion to the altitude. From observations made in the Alps of Switzerland the medium loss of temperature was 1 degree Centigrade (= 1·8 degree Fahrenheit) for every 520 feet of elevation during summer, and for every 910 feet during winter. Whence it follows that the tops of mountains are relatively much warmer in winter than in summer. It has, however, been pointed out that there are "extraordinary modifications, amounting

frequently to subversions of the law, of the decrease of temperature with the height," owing to the circumstance that "the effects of radiation will be felt in different degrees and intensities in different places. As the air in contact with declivities of hills and rising grounds becomes cooled by contact with the cooled surface, it acquires greater density, and consequently flows down the slopes and accumulates on the low-lying ground at their base. It follows, therefore, that places on rising ground are never exposed to the full intensity of frosts at night ; and the higher they are situated relatively to the immediately surrounding district the less they are exposed, since their relative elevation provides a ready escape downwards for the cold air almost as speedily as it is produced." Hence a southern slope at a considerably greater elevation may have a higher night temperature than a neighbouring plateau. "On the other hand, valleys surrounded by hills and high grounds not only retain their own cold of radiation, but also serve as reservoirs for the cold heavy air which pours down upon them from the neighbouring heights." And at the numerous meteorological stations in Switzerland it is observed that "in calm weather in winter, when the ground becomes colder than the air above it, systems of descending currents of air set in over the whole face of the country. The direction and force of these descending currents follow the irregularities of the surface, and, like currents of water, they tend to converge and unite in the valleys and gorges, down which they flow like rivers in their beds. Since the place of these air-currents must be taken by others, it follows that on such occasions the temperature of the tops of mountains and high grounds is relatively high, because the counter currents come from a greater height and are therefore warmer." So the "gradual narrowing of a valley tends to a more rapid lowering of the temperature, for the obvious reason that the valley thereby resembles a basin almost closed, being thus a receptacle for the cold air-currents which

descend from all sides. The bitterly cold furious gusts of wind which are often encountered in mountainous regions during night are simply this out-rush of cold air from such basins.”*

Considerations such as these are of the greatest importance in determining the hygienic character of any particular mountain health resort.

The question of the humidity or dryness of mountain air is one not easy to resolve. The air on the summits of high mountains is no doubt drier than the air at lower levels. But at intermediate levels, considerations other than those of altitude alone determine the relative humidity or dryness of the atmosphere ; so that each mountain station must, to a great extent, be judged of by itself with regard to this very important point. Perhaps, as a general rule, one may say that the higher the locality the less rain falls ; but, on the other hand, we have to face the startling fact that twice as much rain and snow falls at the St. Bernard and St. Gothard stations as at Geneva ! Much will, however, necessarily depend on the configuration of the ground, as well as its aspect. A mountain ridge facing the direction from which moist winds habitually blow will condense their moisture and precipitate it in the form of rain or snow on its sides, or on the valleys or plains at its base ; while more remote summits of the same mountain chain and the higher mountain valleys at their bases may be thus protected and screened from heavy and prolonged rain-falls.

Thus the moist Atlantic winds blowing against the western ranges of Scotland and Cumberland determine the great rain-fall in these regions ; and the town of Santa Fé de Bogota in the Andes, at an elevation of 8600 feet, is visited with almost incessant rain, owing to its situation at the foot of a mountain on the sides of which the warm trade-winds of the South Pacific Ocean become cooled, and condense their moisture.

* Article “Climate,” “*Encyclopædia Britannica*.” New edition.

“Ces phénomènes de pluie et d’humidité excessive,” says M. Jourdanet, “observés en différents points élevés, ne détruisent nullement la réalité habituelle de sécheresse des altitudes. Ils sont la conséquence exceptionnelle de conditions topographiques desquelles resultent, sur une localité, l’arrêt tourbillonnant et l’ascension sur les flancs des montagnes de vents chauds et humides qui condensent leurs vapeurs en pluie par le refroidissement.”

The presence or absence of vegetation will also exercise a determining influence as to the relative humidity of the atmosphere. We must, therefore, bear in mind that certain topographical conditions will frequently induce, in stations of considerable altitude, a moister atmosphere than is found in the neighbouring plains. But if we consider the effect of altitude alone, it is easy to understand how the air of elevated regions must be, *cæteris paribus*, drier than that of lower situations.

In the first place, the lower the atmospheric pressure the more rapid is the process of evaporation, and hence the boiling-point of water is 28·3 degrees Fahrenheit less on the top of Mont Blanc than at the sea level.

Secondly, the energy of the sun’s rays, and therefore their drying effect on the atmosphere, is greater the less the thickness and density of the layers of air they have to traverse. The slope of the soil, the absence of vegetation at great heights, and the greater intensity of the aerial currents all tend to promote dryness of the atmosphere.

Lombard* appears to think that we may distinguish two zones in mountain climates—an upper or dry zone, and a medium or humid zone; their limits varying greatly according to latitude, aspect, and configuration of the soil. For European climates he considers the dry zone to extend from about 3500 to 4500 feet upwards; and the humid zone, where the

* “Les Climats de Montagnes.”

air is moister than it is in higher or lower regions, to extend from an inferior limit of from 1600 to 2000 feet up to 3500 or even 4500 feet. For my own part I fail to see the value of a distinction which has such ill-defined limits.

Mountain air differs then from sea air in three main particulars: 1, in its diminished density; 2, in its lower temperature; 3, in containing less humidity. The temperature is not only lower than that of sea air, it is also less equable. Owing to the clearness of the air, the absence of moisture, and the energy of the sun's rays, very great differences between the day and night temperature are constantly found at great elevations. There is but little aqueous vapour in the air to prevent nocturnal radiation into stellar space from the surface of the soil, greatly heated during the day by the solar rays; thus there is usually a rapid fall of temperature when the sun goes down. In summer a difference of 40 to 50 degrees Fahrenheit between the day and night temperatures will sometimes be registered. There is often also a very great difference between the sun and shade temperatures during the day.

Mountain air resembles sea air in containing an excess of ozone, in its freedom from organic and other impurities, in being cooler than the air of inland districts, and in the fact that its monthly and annual variations of temperature are less than on inland plains.

The study of mountain climates has hitherto taken the form, chiefly, of an investigation into the physiological effects of diminished atmospheric pressure on the human organism. Since different individuals are very variously endowed with the power of accommodating themselves to altered external conditions, it is not to be wondered at that some discrepancies are to be found in the statements of different observers as to the effects upon themselves and others of alterations of atmospheric pressure. Even different animals seem to possess very different degrees of sensitiveness in

this respect. The cat appears to be the most sensitive of animals in this particular; it cannot exist at an elevation above 12,000 or 13,000 feet. Attempts to acclimatise it at Potosi, a town in Bolivia, about 13,000 feet above the sea, have failed. At this elevation it is said to be attacked by very remarkable tetanic fits, commencing, at first, as slight irregularities of muscular movement, as in St. Vitus's dance, and gradually becoming stronger and stronger, inducing the poor animals to make violent leaps, as if they wished to climb up the rocks or the walls of the houses; after violent efforts of this kind they fall exhausted with fatigue, and expire in a convulsive seizure. In the town of Mexico, about 7300 feet above the sea, efforts to introduce the cat, M. Jourdanet tells us, have been more successful. He mentions the attempt of a French lady, who imported a couple of white Angoras. He says: "They rapidly lost their habitual gaiety. They bred, however, but their young family was reared with difficulty, many of them dying in their earliest infancy (drowned, so to say, in rarefied air!). Those who survived had a dejected appearance, not the gay and lively aspect natural to kittens. Most astonishing thing of all, they were all of them deaf." The long-suffering dog, however, abounds in Mexico, and before the conquest the natives used to eat them.*

Jourdanet maintains that persons who are not accustomed to a rarefied atmosphere begin to suffer inconvenience when they attain an elevation of between 6000 and 7000 feet. Most of those who have reported their experiences of mountain ascents in Europe (I am not, of course, alluding to mountaineers *in training*) have not experienced any noticeable inconvenience until they reached nearly 10,000 feet. Soldiers going to Himalayan stations at 7500 feet

* There appears to be no getting out of reach of that enterprising little animal, the flea. Lift up a stone on a glacier, he is there! and we are assured that on the passes of the Himalayas, at an elevation of 18,000 to 19,000 feet, he is there also!

complain at first of shortness of breath, and have a quicker and more feeble pulse ; but these effects are temporary. Of the serious effects of exposure to the highly rarefied air of very considerable elevations we have most valuable evidence in the records of the balloon ascents of Mr. Glaisher. Acceleration of the pulse was one of the first effects noted. At 16,000 feet it had risen from 76 to 100. Between 18,000 and 19,000 feet both Mr. Glaisher and his companion suffered from violent palpitations with difficulty of breathing ; then their lips and hands became of a deep blue colour. As they continued to ascend their respiration became more laborious. On another occasion, at 27,000 feet, Mr. Glaisher became unconscious. It came on with indistinctness of vision, inability to move arms or legs, though he could move his neck ; then he lost his sight completely, though he could still hear his companion speak, but he could not answer him. Then he became wholly unconscious. He also describes a feeling of nausea, like sea-sickness, coming on at great elevations.

The following are the various symptoms that have been recorded by many different observers as occurring during the ascent of lofty peaks or on elevated plains. Great loss of muscular power, palpitations, quick and laborious respiration, bleeding from the nose or gums, drowsiness, severe headache, nausea and vomiting, great thirst, mental depression, enfeebled senses, and impaired memory. The superficial veins become distended, the face pale and bluish. These symptoms were aggravated by exertion and mitigated by rest. Another significant symptom, reported on good authority, both in mountain and balloon ascents, is *increasing coldness of the body* beyond what would be accounted for by the lower temperature of these elevations.

It seems certain, then, both from the evidence of such actual observations as I have referred to, and from the experimental observations of M. Bert in the laboratory of the Collège de France, that when the

rarefaction of the air reaches a certain degree, the due oxygenation of the blood is interfered with, and we get symptoms developed which point to oxygen-starvation, and to obstruction in the circulation through the lungs. In M. Bert's experiments it appeared that slight degrees of diminution of atmospheric pressure did not lessen the affinity of the aerial oxygen for the blood corpuscles; but when that diminution approached or reached one quarter of the whole atmospheric pressure, perceptible disturbances ensued.

M. Jourdanet,* who gives a full account of M. Bert's experiments, concludes that the oxygenation of the blood is not injuriously affected by residence at an elevation below 6500 feet. Above this elevation, he believes the respiratory functions become disturbed, and the due oxygenation of the blood is interfered with. He proposes to restrict the term "mountain climates" to places not exceeding 6500 feet in altitude, and to higher regions he gives the title of "*climats d'altitude*." Moreover, he maintains that those who live all their lifetime at great elevations, as, for example, the natives of the various towns on the high plateaus of Mexico, Bolivia, and Peru, are by no means striking examples of health and vigour. They are, according to his experience, especially prone to suffer from anæmia and the disturbances of health associated therewith—pallor, breathlessness, palpitation, vertigos, dyspepsias, and neuralgias! Lombard also tells us that the monks of St. Bernard, after several years' residence there,

* I refer to his elaborate treatise published in 1875, with the title "*Influence de la Pression de l'Air sur la vie de l'Homme*," a work in two large and profusely-illustrated volumes, which would have been much more valuable than it is had it been less diffuse. Much that Dr. Jourdanet writes is from personal observation, as he resided for many years in the mountainous regions of Mexico. But what can he know personally of the "*Séparation des hommes au pied de la Tour de Babel*," of which he presents us with an engraving, "*d'après les indications de l'auteur*"?

present various signs of anæmia, and these are occasionally so grave as to necessitate a removal to the plains.

Not less important than its rarefaction is the dryness of mountain air. Dryness of the air has an important influence on the activity of the bodily functions. These "are facilitated," says Mr. Herbert Spencer, in some interesting remarks on this head, "by atmospheric conditions which make evaporation from the skin and lungs tolerably rapid. . . . If the air is hot and moist the escape of water through the skin and lungs is greatly hindered; while it is greatly facilitated if the air is hot and dry. Needful as are cutaneous and pulmonary evaporations for maintaining the movement of fluids through the tissues, and thus furthering molecular changes, it is to be inferred that, other circumstances being alike, there will be more bodily activity in the people of hot and dry localities than in the people of hot and humid localities. . . . The evidence justifies this inference. The earliest recorded civilisation grew up in a hot and dry region—Egypt; and in hot and dry regions also arose the Babylonian, Assyrian, and Phœnician civilisation." He further points out that from the "rainless district extending across North Africa, Arabia, Persia, and on through Thibet into Mongolia, have come all the conquering races of the old world. . . . These races, widely unlike in type, and speaking languages deemed as fundamentally distinct, from different parts of the rainless district have spread as invaders over regions relatively humid. Original superiority of type was not the common trait of these races; the Tartar type is inferior as well as the Egyptian. But the common trait, as proved by the subjugation of other races, was energy. And when we see that this common trait in races otherwise unlike had for its concomitant their long-continued subjection to these special climatic conditions—when we find, further, that from the region characterised by these conditions the

earliest waves of conquering emigrants, losing in moister countries their ancestral energy, were overrun by later waves of the same races, or of other races coming from this region—we get strong reasons for inferring a relation between constitutional vigour and the presence of an air which by its warmth and dryness facilitates the vital actions.”

But mountain air is not only drier than sea air and the air of inland plains, it is also colder. Now this lowering of temperature tends, to a certain degree, to compensate for the deficiency of oxygen dependent on its elevation. For instance, in a given volume of air at 1400 feet above the sea, at a temperature of 32 degrees Fahrenheit, there is as much oxygen as in the same volume of air at the sea level at 60 degrees Fahrenheit. So that such virtues as are lessened in mountain air by its elevation are, in part, restored by its coldness. And this leads me to speak of what I have always believed to be an important modification of mountain air. I mean the air in mountain districts that is found on the surface of vast glaciers. The contact of an enormous refrigerating mass, such as an extensive glacier is, with the lower strata of the air over it, has, I take it, two necessary effects upon that air. First, it makes it drier than the air over the adjacent country, because it must tend to condense whatever aqueous vapour there is in the air on to its surface, where it remains frozen. Secondly, it must exercise a certain amount of condensing effect on the air itself—on these strata in immediate contact, or very close to it—so that we breathe thicker, denser, richer air on a glacier than we do on the land near it, at the same elevation. Thus the air over a glacier may be compared to a can of milk turned upside down—in which the cream accumulates at the bottom instead of at the top. Whoever has walked much on glaciers, in elevated districts, must have noticed that they breathe with increased freedom and with less effort as soon as they get well on to the glacier. Some have thought this simply a moral effect; but I think I

have observed it again and again when it was impossible to associate it with anything other than a purely physical influence. I have, therefore, great confidence in the restorative and tonic effect of glacier air for persons who retain a fair amount of muscular strength and activity ; and I consider the adjacency of a great glacier, of tolerably easy access, a great recommendation to a mountain health resort. This is one of the advantages which belongs to Pontresina, in the Upper Engadine. The great Morteratsch glacier is within about an hour's walk of the village ; and after the little climb that is necessary in order to get on it, there is a vast field of glacier easily traversed in all directions, extending for miles, and rising very gently along the whole distance until the broken part of this immense ice-stream is reached.

Having thus considered in detail the properties of sea and mountain air, having noted in what particulars they agree and in what important points they differ, we are now prepared to approach the consideration of the following highly practical questions : Who should go to the mountains ? who should go to the sea ? and who should go to neither ? I should like to answer the last question first. I believe there is no greater mistake made than that very general one of sending *all convalescents* to the seaside, except the still greater one of actually embarking them on a sea voyage ! It arises from the very natural desire to hasten convalescence after acute disease. I am now speaking exclusively of convalescents from acute diseases. But these unwise attempts to hasten convalescence are the very frequent cause of serious relapses. In the general debility which follows a fever or an acute inflammation all the organs share—the organs of nutrition, the secretory, the circulatory, the eliminatory organs, are all feeble and unable to do much work without exhaustion. If an attempt is made to over-stimulate them, if an appetite is induced before digestive power has been regained, a feverish

state is frequently re-excited, and the very effort that has been made to hasten recovery retards it.

Sea and mountain air are alike too stimulating and exciting for such cases. They arouse to premature activity when the organism can strengthen itself only by absolute repose. "How *poor* are they that have not patience" was never so applicable as to cases such as these. Pure, unexciting country air, in a locality where the patient can be thoroughly protected from cold winds, and where he can "bathe in the sunshine or slumber in the shade"—that is the safest and best place for the invalid to slowly, but steadily, regain health after severe acute disease. Sea or mountain air may, however, be needed later on to promote recovery from the chronic affections which occasionally follow acute ones, and then sea air is probably the more appropriate of the two.

Speaking generally, those who seek health in high mountain districts should be capable of a certain amount of muscular activity. Those who suffer from great muscular debility as well as general exhaustion, and who need absolute or almost absolute repose, are unsuited for mountain climates. Such climates are too rigorous, too changeful, too exciting; and the persons to whom I now allude, when they find themselves in the cold, rarefied, exciting mountain air, feel out of place and become chilled, depressed, and dyspeptic. One also finds such persons amongst those whose desire for mental activity is somewhat in excess of their mental power, especially when this is combined with a feeble physique; or amongst those who incessantly and heedlessly work a strong though not exceptionally vigorous brain. Such persons need for a time much repose, and they will find renovation with repose *by* the sea, or, still better, in a yachting trip *on* the sea.

There are others, however, who, with vigorous frames and much actual or latent power of muscular activity, become mentally exhausted by the strain of incessant mental labour, anxious cares, or absorbing

occupations. Mental irritability usually accompanies this exhaustion, great depression of spirits, with unrest of mind and body. These are the typical cases for the mountains. The stimulus and object which they afford to muscular exertion; the bracing atmosphere rousing the physical energies and re-awakening the sense of powers unimpaired and unexhausted; the soothing effect of the quiet and stillness of high mountain regions, and the absence of the human crowd—all these influences bring rest and renovation to the over-worn mind.

It is important to remember that the same individual may, at different times and under different conditions, be differently affected by sea and mountain air. If he happens to be the victim of an irritable and exhausted nervous system, the result of overstrain, he will, probably, be benefited by removal to the mountains; if, on the other hand, he should be slowly recovering from chronic disease, and especially from certain surgical maladies, or after surgical operation, where the processes of tissue-change require hastening without necessitating any activity in the patient himself, then he should go to the sea.

Sea air is better suited than mountain air to persons who cannot bear great and sudden changes of temperature, as is the case with most of those who suffer from grave chronic maladies, as well as with many others. If, however, it should turn out, as suggested by Professor Beneke, that rarefied air is a bad conductor of heat, we can readily understand why a high degree of cold at a great elevation should exercise a much less injurious and depressing effect on the animal organism than the same degree of cold at the level of the sea.

A certain morbid sensitiveness to cold, or rather to "taking cold," is often greatly lessened by a residence in the bracing rarefied air of elevated localities, and the same good effects are also to be obtained by such persons from exposure to a bracing sea air, especially if accompanied by sea-bathing.

Speaking within very wide limits, mountain air is less suitable to persons advanced in years than sea air. The very stimulus to muscular exertion which mountain air produces is to persons much past middle life often a pitfall and a snare. *Qui va doucement, va loin*, is especially applicable to this period of life, and the state of feverish activity which is sometimes induced in aged persons in the mountains is not by any means for their good.*

We must not forget to consider that the effects of sea air vary very much with locality. The very bracing effects which Professor Beneke observed in the isle of Norderney would not be found, for instance, in the warm moist air of our own south-western coasts. The former locality would, no doubt, be frequently visited by the cold, dry, continental east winds. The watering-places on our east coast enjoy a much more bracing and less humid atmosphere than those on our west and south-west coasts, and those on the north coasts of France and Belgium have a drier air than either. The warm, moist, and soothing, but relaxing climate of Penzance and Torquay suits admirably many persons with irritable, hyper-sensitive mucous membranes, to whom the air of Cromer or Lowestoft would be unbearably exciting and irritating. To many the air of Bournemouth proves particularly soothing; the air here is, I believe, drier than in the more southern coast-towns, partly on account of the absorbent nature of the soil; moreover, it does not lack a certain bracing quality.

The Undercliff, in the Isle of Wight, Hastings, and St. Leonards are cheerful and sunny spots, more bracing than the resorts farther west, and not so

* I met a well-known statesman in Switzerland a year or two ago, who with characteristic wisdom and discretion informed me that he was going to visit a locality where he could *look at* a mountain he had once *climbed*. There are many who with much less vigour than this gentleman possessed, when they get into the neighbourhood of mountains, are not content, as they should be, with simply contemplating them.

bracing as those farther east. Brighton possesses a very bracing stimulating sea air ; a much too-decided sea climate for many delicate persons, whom it often renders bilious and dyspeptic. Those who know Brighton well assure me that the higher part, viz. what is called Kemp Town, is much more bracing and healthy than the central and western parts. One of the most eminent medical men at Brighton assures me that he has often had to remove patients from the central to the eastern part of Brighton to promote convalescence or recovery from illness, and with the happiest results. Eastbourne and Folkestone are excellent quarters, both for sea air and sea-bathing. Eastbourne, in many respects one of the most agreeable and bracing of our south-coast resorts, with its magnificent promontory of Beachy Head, has the unfortunate drawback of being greatly exposed to the east winds, which are especially obnoxious during the spring months. Some of the local medical authorities maintain, however, that if Eastbourne is somewhat more exposed to the east than other rival resorts on the south coast, this is more than compensated for by its smaller rainfall and greater amount of sunshine. Folkestone is especially bracing on its east and west cliffs, where, at a considerable elevation above the sea, the air is less charged with moisture, and when the wind blows off the land it comes fresh across the fine open downs behind the coast. Dover is a good and convenient bathing station. Still farther east, but maintaining something of a southern aspect, we have Ramsgate, and then, with a more decidedly easterly aspect, Margate. These two last are most valuable bracing health resorts, the air there possessing important tonic properties. On the drier and more bracing east coast we have Lowestoft, Yarmouth, Cromer, Filey, Scarboro', Whitby, Redcar, Saltburn, and others.

The health resorts on the French and Belgian coasts on the other side of the Channel possess a drier and brighter air than our own coast towns ; and, as

they are very accessible, they offer decided attractions to those persons, and they are very numerous, who find advantage in breathing a drier air than can be obtained in Great Britain. Boulogne, Dieppe, Trouville, Fécamp, and especially Etretat, are favourite French resorts ; the latter is exceedingly picturesque, and has the advantage of being a place of much more simple and quiet manners than its neighbours. On the Belgian coast, Ostend is the best known and most popular watering-place, but Blankenberghe, a fishing-village about three hours by rail from Bruges, is, for many reasons, much to be preferred. It has a finer promenade on the seashore, and the life there is much more retired and simple.

Having thus briefly attempted to characterise a few of the principal resorts where sea air and sea-bathing can be enjoyed, I must next pass rapidly in review a few of the chief mountain stations on the Continent ; and first of all, in importance and usefulness, I would mention the Engadine. The Upper Engadine, as a mountain health resort, must be regarded as typical and unique, so far as Europe is concerned. It is a wide valley, running for many miles at a nearly uniform level of from 5000 to 6000 feet above the sea, and bounded by mountains of comparatively moderate height. By its considerable elevation and its peculiar geographical position, it is removed, in a great measure, from the regions of cloud and mist. By its peculiar geographical position I mean its remoteness from the lower-lying districts which are nearest it. From the north it is approached by a road which, starting in the Rhine valley at an elevation of over 2000 feet above the sea, pursues for nearly fifty miles a steady ascent, the only notable descent in the whole way being at Tiefenkasten (2900 feet), thence for nearly thirty miles the ascent is unbroken till the northern barrier of the valley is surmounted. On the south it is separated from the Val Tellina, about thirty miles distant, by a vast mountain range covered with ice

and snow, and reaching an elevation of nearly 14,000 feet, and which protects it, to a great extent, from the mists rising from the southern plains of Italy. Towards the east it stretches for thirty miles without descending 1000 feet, and there it is again separated from any lower level by a high mountain range, which forms a striking and grand eastern boundary to the Upper Engadine. Its only vulnerable point, speaking climatologically, is towards the west, or rather south-west, where it descends somewhat suddenly into the Val Bregaglia; this descent continues steadily towards the south-west, till it reaches the Lake of Como. It is from this quarter that nearly all the clouds and rain come that visit the Engadine. It is to its remoteness from the lower levels that the Engadine owes its peculiar and characteristic mountain climate; and it is on this account that persons fail to find the same bracing effects at the same, or nearly the same, elevations elsewhere.

The general characters of the Engadine and its several health resorts—St. Moritz, Pontresina, etc.—will be treated of fully in other chapters.

The *Davos* valley is another mountain station in the Grisons, about 5000 feet above the sea. It is situated to the north of the Engadine, with which it runs parallel, at a distance, as the crow flies, of probably not more than twenty miles. To the lover of the picturesque it can offer few attractions compared with those of the Engadine, only a few hours distant; while the fact that it is the special resort of several hundred consumptive patients would, in itself, deter many from making it a resting-place. It has a *kurhaus*, which has been carefully fitted up and adapted with baths and douches for the systematic treatment of chest affections. I shall have to speak more at length of Davos as a health resort when I come to treat, in a subsequent chapter, of high mountain valleys, as sanatoria for consumptive patients.

Bormio, 4300 feet above the sea, at the foot of the Stelvio, on the Italian side, and at the head of the

Val Tellina, is also in the immediate neighbourhood of the Engadine, and a pedestrian starting from Pontresina can cross over the mountainous path which extends from the Bernina road to Bormio in one long day. Carriages have to make a long detour by Tirano in the Val Tellina.

Bormio has long been known for its thermal springs; its climate is milder and more equable than that of the Engadine, owing partly to its southern aspect and partly to its lower elevation. It serves, therefore, admirably as a refuge for those who find the cold of the Engadine too severe, and its climate generally too exciting. Much, however, cannot be said as to the beauty of its situation. The country around has a barren and unattractive aspect, and the Baths of Bormio have a background of reddish, hot-looking, bare mountains, of uniform sugar-loaf form. But it is close to very beautiful scenery; for it is only seven miles through the picturesque Val Furva to the Baths of *Santa Catarina*, 5700 feet above the sea, a mountain station very nearly as high as St. Moritz, and, like St. Moritz, possessing a strong chalybeate spring. This is an exceedingly beautiful spot, surrounded by a semicircle of magnificent snow-covered summits. From its position on the southern side of the Alps, and from its being enclosed by an amphitheatre of lofty mountains, its climate is no doubt much less bracing than that of the Upper Engadine. Were it not for this circumstance, and its greater distance from home, Santa Catarina would certainly become a formidable rival to St. Moritz.

The Baths of *Tarasp* and the picturesquely situated village of *Schuls*, about a mile from the baths, as well as the little hamlet of Vulpera, still nearer the baths, ranging from 4000 to 4800 feet above the sea, are also in the vicinity of St. Moritz, being situated in the Lower Engadine, about six hours drive from Samaden. Here the climate is much milder than in the upper valley of the Inn. The waters of Tarasp have virtues and a deservedly high reputation

of their own, quite independent of the mountain climate; but Schuls and Vulpera offer excellent resorts for those who need less decidedly bracing treatment than is to be found at St. Moritz, while they also afford convenient intermediate resting-places for those delicate and sensitive persons who may desire to avoid either a too sudden approach to, or a too sudden descent from, the rarefied air of the Upper Engadine. (Of the special merits of Tarasp as a health resort I shall have to treat in detail by-and-by.)

The villages of Bergün and Molins, the one on the Albula Pass and the other on the Julier, are the places, perhaps, most commonly selected for the purpose of breaking this ascent or descent. But apart from the fact that the latter certainly is hardly sufficient of a break, they neither of them afford quite that amount of comfortable accommodation which invalids require for a three or four days' stay. Bergün is most picturesquely situated, and if the village were improved in cleanliness and a really good hotel established there, it ought to prove an attractive resting-place *en route* to or from the Engadine.

A new resource has been provided within the last four or five years for breaking conveniently the descent from St. Moritz, by the opening of an hotel in one of the most beautiful parts of the Val Bregaglia—the Hotel Bregaglia—situated between Vico Soprano and Castasegna, and between 1000 and 2000 feet higher than Chiavenna, the station to which persons hitherto had to descend in going from the Engadine towards Como and North Italy. This will be a real gain to invalids going south.

Monte Generoso, situated between the lakes of Lugano and Como, and usually ascended from the town of Mendrisio, has lately become justly popular as a health resort, since Dr. Pasta has established a comfortable hotel a few hundred feet below the peak, which is between 5000 and 6000 feet above the sea. This, for its elevation, is a comparatively mild mountain situation, and better suited on that account

to highly sensitive organisations, while the beauty of the scenery it commands can scarcely be surpassed. It is a most convenient locality for persons coming north, after wintering in the south of France or Italy.

Of other frequented European mountain stations a very brief account must suffice. Of very bracing health resorts over 6000 feet, the following are the best known: The hotels on the *Æggisch-horn* and the *Bel-Alp*, the former ascended from *Viesch*, the latter from *Brieg* in the *Rhone* valley, in the midst of the grandest mountain scenery, and close to the great *Aletsch Glacier*; there is also an hotel on the *Rieder-Alp*, between these two; the *Riffel Hotel*, facing *Monte Rosa* and the *Matterhorn*; and the hospices of the *Great St. Bernard*, of the *St. Gothard*, of the *Bernina*, and of the *Grimsel* passes.

Of bracing, but less extreme, mountain climates, ranging between 5000 and 6000 feet above the sea, the following may be mentioned: The *Baths of San Bernardino*, on the southern side of the pass of that name, where there is a chalybeate spring. Its southern aspect moderates the rigour of its high mountain climate. *Mürren*, beautifully situated above *Lauterbrunnen*; the *Rigi Scheideck*; the village of *Zermatt*; *Panticosa*, on the southern slope of the *Pyrenees*, in the province of *Aragon*, a few hours from *Les Eaux Chaudes*; here there are alkaline and other springs; this fact and its moderate temperature have made it a resort for consumptive patients, chiefly from *Spain*.

Of milder and less exciting mountain climates we have a great variety to choose from: ranging between 4000 and 4500 feet we have *Comballaz* in the *Val des Ormonds*, about three miles above *Seppey*; the *Baths of Leuk*, at the foot of the *Gemmi*; *Weissenstein*, a ridge of the *Jura*, near *Solothurn*, a station for the goats' milk and whey cure, commanding a very fine view; the village of *Andermatt*, on the *St. Gothard* road; the well-known *Kaltbad* on the *Rigi*; *Barèges*, in the *Pyrenees*; and the town of *Briançon* in *Dauphiné*, and many others.

Of those between 3000 and 4000 feet I may name Beatenberg, over 3500 feet, in an admirable situation above the right bank of the Lake of Thun ; Gurnigel, also over 3500, a frequented sulphur bath not far from Berne ; Courmayeur, nearly 4000 feet ; Grindelwald ; Engelberg, a favourite mountain resort at the foot of the Titlis, and near glaciers, with an equable, fresh and tonic climate, and whey and goats' milk cure ; Chateau d'Oex in the Simmenthal ; Chaumont, overlooking Neuchatel, and easily approached from that town—like most of the Jura stations, it is more exciting and bracing than other localities of the same elevation. Sainte Croix, also near Neuchatel, on a declivity of the Jura chain, is about 3600 feet. St. Cergues, also in the Jura, is a village built in a gorge looking east, at the foot of the Dôle. It is much frequented for its bracing climate, but it is considered too irritating for delicate impressionable persons. The climate of the Jura chain is said to be generally colder and more humid than that of the Central Alps.

A very easily accessible mountain station is that of Mont Dore, in the mountains of Auvergne ; it is ascended from Clermont-Ferrand, within a few hours by rail of Paris ; it is about 3300 feet above the sea and in an interesting country. It has hot alkaline springs which are drunk and used as baths and inhalations. Some consumptive patients are said to have made remarkable recoveries there, notwithstanding the fact that fogs and rain are very prevalent.

As examples of very mild and slightly tonic mountain climates between 2000 and 3000 feet above the sea there are Glion and Les Avants, near Montreux ; St. Gervais, in a very favourable position, near the valley of Chamounix ; Seelisberg, in a protected and mild situation above the Lake of Lucerne ; Gais, Weissbad and Heiden, in the canton Appenzell, above the Lake of Constance ; these three are exceedingly pleasant, quiet resorts, out of the way of the beaten track, and excellently well suited for those who need

repose and quiet in a pure and moderately bracing air.

Finally, whether we seek health in the mountains or by the sea, in either case we shall find change—that change which is the type of life and the condition of health ; that change which is rest. And who shall estimate the moral, as well as physical, refreshment we gain by changing the sordid routine of city life, the “greetings where no friendship is,” for the contemplation of the solemn moods of Nature, whether in sea or mountain ? Looking on these eternal realities, in the grandeur of their calm repose or in the majesty of their roused anger, we recover that sense of proportion which we are so prone to lose—our sense of the relative proportion of the individual to the whole. Or, if we need no such stern reminders, we may seek changeable Nature in her gentler moods in the soft woodland shade, and there, amidst the perfume of flowers, the songs of birds, and the murmur of the trees, we may, as well as by the sea or on the mountain, recover health of mind and body as we

“Draw in easier breath from larger air.”

CHAPTER II.

THE ENGADINE.

VACATION STUDIES IN THE UPPER AND LOWER VALLEYS
OF THE INN.

THE JOURNEY THERE.

IT is now more than twelve years ago that I first spent an autumn vacation in the Upper Engadine ; since then I have passed the greater part of seven other vacations in that invigorating climate. The means of getting there remain much the same now as they were some twelve years ago. The railway journey from Bâle to Zurich has been shortened by a new line which avoids the detour by Olten, and a new line has also been made along the west shore of the Lake of Zurich. At Zurich, if you are so disposed, you can quit the train and cross the lake to Rapperschwyl by steamer, an agreeable change in hot weather. At Rapperschwyl you join the train again, and in a short time reach the beautiful Lake of Wallenstadt. The railway runs along the shore of this lake in nearly its whole length, and so enables the traveller to see its wild and grand scenery to advantage. Soon after leaving the shores of the Lake of Wallenstadt the train reaches Ragatz, where most persons who have not already seen the Baths of Pfeffers remain a few hours in order to visit the remarkable gorge where these hot springs have their source. Those who are

independent of public conveyances may find it convenient to sleep at Ragatz, where there are excellent hotels. From Ragatz to Chur is only half an hour by rail, and the carriage-drive from Chur to Tiefenkasten makes altogether a very easy day, and conveniently divides the long distance of nearly fifty miles by road from Chur to the Engadine.

There are very fair hotels in the quaint picturesque little town of Chur, and the Steinbock may certainly be said to be "clean and comfortable." It is rather noisy and bustling in the early morning hours, when the various diligences are preparing to start for their several destinations; and as I have already said, invalids will find Ragatz a quieter resting-place.

I never see Chur without thinking of Thackeray's charming and characteristic description of it; nor without wondering that, in this age of rapid change, it should remain almost as accurate now as when he wrote it.

"The pretty little city," he observes in one of the "Roundabout Papers," "stands, so to speak, at the end of the world—of the world of to-day, the world of rapid motion, and rushing railways, and the commerce and intercourse of men. From the northern gate the iron road stretches away to Zurich, to Basel, to Paris, to home. From the old southern barriers, before which a little river rushes, and around which stretch the crumbling battlements of the ancient town, the road bears the slow diligence or lagging vetturino by the shallow Rhine, through the awful gorges of the Via Mala, and presently over the Splügen to the shores of Como.

"I have seldom seen a place more quaint, pretty, calm, and pastoral than this remote little Chur. What need have the inhabitants for walls and ramparts, except to build summer-houses, to trail vines, and hang clothes to dry? No enemies approach the great mouldering gates; only at morn and even the cows come lowing past them, the village maidens

chatter merrily round the fountains, and babble like the ever-voluble stream that flows under the old walls. The schoolboys, with book and satchel, in smart uniforms, march up to the Gymnasium, and return thence at their stated time. There is one coffee-house in the town, and I see one old gentleman goes to it. There are shops with no customers seemingly, and the lazy tradesmen look out of their little windows at the single stranger sauntering by. There is a stall, with baskets of queer little black grapes and apples, and a pretty brisk trade with half-a-dozen urchins standing round. But, beyond this, there is scarce any talk or movement in the street. There's nobody at the book-shop. 'If you will have the goodness to come again in an hour,' says the banker, with his mouthful of dinner at one o'clock, 'you can have the money.' There is nobody at the hotel, save the good landlady, the kind waiters, the brisk young cook who ministers to you. Nobody is in the Protestant church (oh! strange sight, the two confessions are here at peace!)—nobody in the Catholic church, until the sacristan, from his snug abode in the cathedral close, espies the traveller eyeing the monsters and pillars before the old shark-toothed arch of his cathedral, and comes out (with a view to remuneration possibly) and opens the gate, and shows you the venerable church, and the queer old relics in the sacristy, and the ancient vestments (a black velvet cope, amongst other robes, as fresh as yesterday, and presented by that notorious 'pervert' Henry of Navarre and France), and the statue of St. Lucius, who built St. Peter's Church, opposite No. 65, Cornhill. His statue appears surrounded by other sainted persons of his family. With tight red breeches, a Roman habit, a curly brown beard, and a neat little gilt crown and sceptre, he stands, a very comely and cheerful image.

"What a quiet, kind, quaint, pleasant, pretty old town! Has it been asleep these hundreds and hundreds of years, and is the brisk young Prince of

the Sidereal Realms in his screaming car drawn by his snorting steel elephant coming to waken it? Time was when there must have been life and bustle and commerce here. These vast venerable walls were not made to keep out cows, but men-at-arms, led by fierce captains, who prowled about the gates, and robbed the traders as they passed in and out with their bales, their goods, their pack-horses, and their wains. Is the place so dead that even the clergy of the different denominations can't quarrel? Why, seven or eight, or a dozen, or fifteen hundred years ago—a dozen hundred years ago, when there was some life in the town, St. Lucius* was stoned here on account of theological differences, after founding a church in Cornhill."

The first evening I saw Chur the rain was pouring down in torrents, and the surrounding mountains were concealed by a dense covering of mist, while the swollen Rhine, hurrying along its shallow bed and overflowing its very low banks, looked on the whole a dirty, straggling, and untidy river. It was not pleasant to think of a drive of fifty miles over the mountains, into the Engadine, in weather like this. Happily, the next morning dawned on a very different day.

From Chur to St. Moritz is a day's journey by diligence. At four o'clock in the morning after my

* Dean Stanley observes that King Lucius is the reputed "founder of the originals of many English churches—St. Peter's Cornhill, Gloucester, Canterbury, Dover, Bangor, Glastonbury, Cambridge, Winchester. He it was who was said to have converted the two London temples into churches" (the Temple of Apollo at Westminster, and the Temple of Diana at St. Paul's). "Of him, too, the story is told how the British king deserted his throne to become a Swiss bishop at Coire in the Grisons, where in the cathedral are shown his relics, with those of his sister Emerita, and high in the woods above the town emerges a rocky pulpit, still bearing the marks of his fingers, from which he preached to the inhabitants of the valleys, in a voice so clear and loud that it could be heard on the Lucienstieg (the Pass of Lucius) twelve miles off."—"Stanley's Memorials of Westminster Abbey."

arrival I was roused from my slumbers in a somewhat sulky mood, for one does not get reconciled immediately to the early hours of the country, and I prepared to take my place in the diligence which leaves Chur for St. Moritz somewhere about five in the morning. I joined the crowd of passengers surrounding the vehicles, some going by the Splügen and the Bernardino into Italy, others bound as I was for the Engadine. A motley group we formed at this early morning hour—Swiss, Germans, French, Italians, Americans, English, mixed up together, and on the whole looking rather gloomy and taciturn; a sense of injury at having been disturbed so early was plainly depicted on the countenances of most of those who were of Anglo-Saxon race. Some were unmistakably invalids: their languid, drooping appearance and pale faces marked them out as fellow-travellers seeking a renewal of health and vigour from the iron-waters and the mountain air of St. Moritz. As it happened to be just the very height of the season, the number of passengers desirous of proceeding into the Engadine was unusually large, and, in addition to the ordinary diligence, vehicles of various kinds were pressed into the service. If, at this time of the year, you would see in comfort the fine scenery through which you will have to pass, it is a wise precaution to secure, by telegraphing some days beforehand, the *coupé* or still better the *banquette* places in the diligence. Those who fail to do so are compelled to accept such accommodation as the officials at Chur choose to provide. It may be a place in the interior of the diligence, with small chance of seeing to advantage the beauties of the country; or you may be packed into the inside of a narrow omnibus, with scarcely room enough to move a limb!

There are two routes from Chur into the Engadine traversed daily by diligences—one by the Albula to Samaden, the chief place in the Engadine, about three miles from St. Moritz; the other by the Julier Pass to Silva Plana and St. Moritz. The

latter is the shorter route of the two for those intending to stay at St. Moritz. The former is more convenient for those who intend making Samaden or Pontresina their head-quarters. The road as far as Tiefenkasten used to be the same for both routes; but a most agreeable route from Chur to St. Moritz, especially to those who have never visited the Via Mala, is now taken by the diligences which follow the Julier Pass. This route is somewhat longer and less direct than the other by the Albula, as it goes round by Thusis, which is situated at the entrance to the Via Mala. But it takes you through the beautiful scenery of the Schyn Pass, between Thusis and Tiefenkasten, which is equal to anything in Switzerland for grandeur and variety.

By the other route, in rather more than an hour from Chur you reach the pleasant village of Churwalden, 3976 feet above the sea. Churwalden is a "cure-place" (kurort), for you are now in a country of "cures." Switzerland has been called the "play-ground" of Europe; with almost equal justice it might be termed the "Kurhaus" of Europe. The mineral springs of this country are indeed most abundant—saline, chalybeate, sulphurous, and simply thermal; but it is not to its mineral sources merely that Switzerland trusts in order to restore lost health, and to bring back declining powers to the invalids of Europe; it has also its mountain-air cure, its whey cure, its grape cure, and a facetious German fellow-traveller assured us that it was likely soon to add another to this list, in the form of a sandwich-cure. So that it is no uncommon thing in this country to meet with an individual who, as Émile Souvestre has observed in one of his charming Swiss sketches, "*après une cure de bains à Bex, faisait une cure d'air au Selisberg, pour continuer par une cure de chaud lait dans la Gruyère, et finir par une cure de raisin à Clarens.*"

But if Switzerland is *par excellence* the land of cures, this Canton Graubunden is *par excellence* the

canton of cures; and nearly every third village is a "kurort," and has its "kurhaus," its "kurliste," its "kurarzt," its "kurmusik," and finally its "kuristen," as those are termed who come to be cured.

Churwalden, then, is a kurort, a "Luft-kurort," or air-cure, and has several hotels and *pensions*, and a kurhaus and baths and a kurarzt, and all that is necessary for the equipment of a "cure-place." This spot has really many attractions; it is within an easy distance of Chur, and it is most pleasantly situated in a mountain valley, running from north to south, watered by the Rabiosa, and rich in woods and meadows. Its climate is represented as being extremely mild, its summer temperature moderate and very little variable; and, unlike many other high mountain valleys, it is singularly free from extremes of heat and cold; so that during the summer months it has no frosts and no oppressive heat, no fogs, very little damp, no snow, a remarkably small rainfall, and but few storms. In these respects it compares favourably with other high stations, such as St. Moritz. Interesting walks and excursions abound in all directions. It seems to answer excellently well as a temporary resting-place for persons who are recovering from the effects of exhausting diseases, and who are too weak to undertake a longer journey to a more distant or higher mountain-station, for which also it serves well as a preparation.

It is certainly to be recommended that weak and delicate persons should not proceed at once from the lower health resorts to a high mountain valley, like the Upper Engadine, but should remain for a time in a moderately elevated situation, such as Churwalden, as an intermediate step between the relaxing temperature of the low valleys and the somewhat rigorous air of elevated localities, such as St. Moritz or Davos. The special curative means which are provided at Churwalden are cows' and goats' milk, whey, and wild strawberries, and conveniences for a regular course of baths. It is especially celebrated

for its excellent white Alpine honey, which gained the prize medal at the Exhibitions of Paris and Berne. Woods of pine and birch cover the hills around. The season begins on June 1, and ends on September 30.

Between Churwalden and Lenz the road is not very interesting; but at Lenz there is a fine view extending in nearly all directions, looking down on Tiefenkasten, and including the commencement of the two routes into the Engadine and the road through the Schyn Pass from Thusis. All these routes used to converge at Tiefenkasten; but the new Albula road, instead of descending to this village, now keeps on a higher level, and passes through Alveneu, where there are sulphur springs and a bath establishment; and near this village a post-road branches off from the Albula route and leads through Wiesen to Davos.

But as we intend to follow the Julier route we must descend to Tiefenkasten. Here, formerly the two roads into the Engadine diverged, that by the Albula to the left, and that by the Julier to the right. At Tiefenkasten, and at the adjacent hamlet of Solis, there are mineral springs of some local repute, but Solis is more remarkable for its bridge, which is situated very boldly at a reputed height of 1458 feet above the stream of the Albula, which rushes along a narrow and rocky bed at this awful depth from the road.

I have already observed that to the traveller who is bound for St. Moritz the pass of the Julier affords a somewhat shorter journey than that by the Albula. The latter route can be taken in returning from the Engadine, so as to avoid going twice over the same ground. For my own part I would say, as M. Michelet does in choosing between the two routes: "*Je préfère les grandes voies historiques où l'humanité a passé.*" Such an "historical road" is the pass of the Julier. That it was frequented by the Romans is very certain, since Roman remains have been

discovered in several places in the Oberhalbstein Valley, at the head of which there is also another important Roman road, the Septimer Pass, leading into the head of the Val Bregaglia.

But it was believed that long before the Romans occupied the province of Rhætia this road was frequented by the earlier Celtic population of the country, and the name of the pass, instead of being derived from Julius Cæsar, would seem to owe its origin to the name of one of the Celtic gods—"Jul."

In the Middle Ages, merchants, pilgrims, and crusaders toiled over this road on their way to Venice, which was then the gateway of the East; and ruins of mediæval castles may still be seen in many parts of the valley.

The Oberhalbstein Valley is entered immediately on leaving Tiefenkasten; it is nearly twenty-four miles long, and its scenery, as well as that of the side valleys which open into it, is very fine.

Pretty villages and hamlets are seen dotted about the mountain-sides; old towers and ruins appear on the heights; and for every village there is a little church, with its pointed spire. Most of these churches are very picturesque, and, considering the size of the villages or hamlets to which they belong, even ambitious in their character. They are built after the Italian style, and are frequently adorned externally with curious frescoes, the work of itinerant painters. The inhabitants of this valley are Roman Catholics. Sometimes one sees a church perched up apparently in a most inconvenient and inaccessible position, where churchgoing in bad weather must be an arduous if not a perilous undertaking.

Below the villages there are cultivated fields, and above them, amidst the mountains, extend woods and green meadows; and above these again, appear the jagged mountain summits, closing in the landscape on every side.

At Mühlen, or Molins, a village about thirty miles from Chur, and eighteen from St. Moritz, there is

usually a little halt. This is the place often selected as a resting-stage by those who are not equal to making the entire journey from Chur to St. Moritz, or from St. Moritz to Chur, in one day, and who do not wish to break the journey at Tiefenkasten. It serves admirably for this purpose, not only on account of the excellent accommodations to be found at the inn there, but also because it is placed in the centre of the finest scenery of the Oberhalbstein Valley, and is surrounded by some of the highest peaks in this district.

The road, gradually ascending, reaches, in about six miles from Molins, the last and highest village in the Oberhalbstein—Stalla or Bivio. Here the two roads divide—the high road over the Julier Pass lying due E.; that into the Val Bregaglia, over the Septimer, mounting S.S.W. For about two hours from Stalla the carriage winds slowly up a very well-made road, which leads in numerous zigzags to the summit of the Julier Pass.

The air here is keen and bracing, and you are reminded of the observation made by the author of the "Regular Swiss Round," that "many thousand Roman noses have been pinched blue with the sharp air of the Julier."

The pass of the Julier is a scene of mixed grandeur and desolation. The most perfect silence and stillness prevail on every side, broken only by the cracking of the whips of the postboys. No tree, no blade of grass, nothing but huge stones, hurled down from the decaying mountains around, with here and there a patch of snow.

The summit of the pass is formed by a flattened ridge extending between two high granite mountains—the Piz Munteratsch and the Pulaschin. A little lake lies on the highest point of the pass, and near it there are two curious roughly hewn granite pillars, about three or four feet high, one on each side of the road, concerning the history of which there has been much discussion.

Their erection has been erroneously ascribed to Julius Cæsar, but many consider them to belong to a much earlier date, and to derive their name Julius from that of the Celtic sun-god Jul, and that they are Celtic sacrificial stones; but such sacrificial sites elsewhere (and there are many in Western Switzerland and in the interior of France) have a very different appearance. Older writers describe only one pillar; then it appears there were three. Murray states that recently, when some alterations were making in the road, one of these columns had to be removed, when some Roman coins were found at its base, bearing the name of Tacitus and the date of A.D. 275. Of all the passes of the canton this is the earliest free from snow, and it is also said to enjoy a remarkable immunity from avalanches.

The climate of the Oberhalbstein Valley, which ends in the pass of the Julier, is reported to be, on the whole, more inclement than that of other valleys lying equally high, because of its exposure to the north wind. Above Roffna there is but little cultivation. A great part of the soil is rocky and dry, and unfavourable for Alpine farming. The population is scanty; the inhabitants are for the most part tall and strong, and renowned of old for a brave and resolute demeanour. They speak the Romansch dialect.

The road begins to descend immediately after passing the Pillars of Julius, and soon the green meadows and blue lakes of the Upper Engadine, with the pretty village of Silva Plana, come into view—a somewhat sudden but pleasing transition from the wild and desolate scene which is left behind. Very beautiful indeed did this part of the valley appear to me when first I saw it from the Julier Road. The clear, deep blue, unclouded sky; the rich green meadows, lit up with the soft and subdued light of the late afternoon sun; the wooded mountain-sides, topped by the eternal snow-clad summits of the Bernina chain; the clear, still lakes, whose unruffled waters reflected, as in a mirror, blue sky and wooded

mountain, clustering village and ice-clad summit, composed a scene which made one feel glad that, for a few weeks at least, one had exchanged the hot and dusty streets of noisy London for the calm beauty and fresh breezes of this quiet Alpine valley, much quieter twelve years ago than it is now !

The diligence sweeps rapidly down the steep zig-zags that lead from the summit of the pass to the village of Silva Plana. In a quarter of an hour more it reaches the picturesquely situated village of Campfer, with its noted hotel, the Julierhof, renowned for its comfort and excellent food ; here many of the visitors to the baths of St. Moritz wisely reside, and by so doing avoid the lowlying hotels around the Kurhaus, or the toil uphill to those in the not very pleasant village of St. Moritz. Campfer is just as near the Kurhaus and the baths as St. Moritz, it is connected with them by an excellent level road, as well as by a most charming foot-path through woods and meadows. On leaving Campfer the road continues on the left bank of the river, and we soon observe the Kurhaus of St. Moritz, placed in the meadows at the western extremity of the St. Moritz lake, looking "like a union-house in a fir-plantation." In a few minutes the diligence turns off from the high road in order to cross to the opposite bank of the river, and soon it draws up on the gravel drive in front of the Kurhaus.

ST. MORITZ.

Twelve years ago St. Moritz was far other than it is now, although even then it had begun to assume the aspect of a fashionable watering-place. But hotels and *pensions* were few and accommodation limited, and the struggle for rooms which followed a long day's journeying over the mountains was most trying both to mind and body. I well remember how anxious we all felt, when we were drawing near the end of our journey, as to what chance we had of being comfortably housed for the night. We had been warned in London, in Paris, at Bale, at Zurich, at Chur, and indeed at every stopping-place on the road, that St. Moritz was full, full to overflowing. And so it proved to be. The Kurhaus was quite full, and during the delay of the mail-coach there, some, desirous of learning their fate, hired an ein-spanner (a light carriage with one horse), and dashed on towards the village, determined to secure apartments if possible at the Kulm Hotel or perish in the attempt: Others had engaged rooms weeks ago, and had even received replies assuring them that apartments would be retained for them; but even this was not sufficient to allay the anxiety which the reports we had heard on the way had aroused. A painful expression of anxious uncertainty as to what might be our fate, for that night at least, was visible on all our countenances. In this unhappy condition we drove along the road bordering the pretty little St. Moritz lake, and in a very short time reached the village of St. Moritz, about a mile from the Kurhaus. Descending at the Bureau de Poste, confusion and disappointment soon became apparent amongst the numerous

arrivals. Unprotected females in ones and twos, as well as in larger and more formidable groups, were making violent and as it seemed unsuccessful attempts to force an entrance into the chief hotel of the place; others were wandering about in a state of disconsolate uncertainty, having received some kind of promise of accommodation, but almost fearing to discover what that accommodation might prove to be. Some of them were manifestly invalids, and, unfortunately, upon those not unfrequently the least attention was bestowed, so that very uncomfortable apartments fell to their lot.

It is hardly necessary to say that invalids should always be careful to secure a promise of good accommodation some time beforehand wherever they go. But St. Moritz at that moment was the new health resort, and invalids were rushing to it in great numbers without much inquiry and without good advice. Now things have changed completely. St. Moritz, instead of having but one good hotel and one good *pension*, as was the case then, is covered with huge hotels and lodging-houses, to the entire destruction of its seclusion and the great impairment of its picturesqueness. Moreover, the peculiar character of its climate and the proper uses of its mineral springs are much better understood now than they were then, and the many victims of grave incurable maladies that found their way to St. Moritz twelve years ago are no longer permitted to commit so serious a blunder.

Many invalids at that time were obliged to put up with whatever accommodation they could obtain, no matter how rough. They were turned away from the Kurhaus, they were turned away from the only good hotel in the place, and, after wandering about the village in search of a resting-place, they perhaps finally obtained shelter in a room that was little better than a hayloft.

The hotel-keepers then were no respecters of persons. I remember one very cold evening in August I was requested to see a foreign lady of rank, who had

brought an introduction to me from her physician in Paris. She was in delicate health, and travelling with another lady as a companion, and accompanied by a maid and man-servant. I found them placed in a wretched little room, which I had to approach by a ladder, and which was placed over a hayloft. The man and the maid-servant were on the landing. Whatever food they needed had to be brought from the nearest hotel. This lady had engaged rooms some time before her arrival; but as she did not appear on the precise day she had named, they were not kept for her. Things have altered greatly since then. Besides the Kurhaus, the situation of which has always been objected to by many—it is built in flat marshy meadows, at the end of the lake of St. Moritz, about a mile from the village, and about three hundred feet lower than its highest part—the principal and indeed the only decent hotel at St. Moritz at that time was the Engadiner Kulm, kept by Herr Badrutt, and built in the most agreeable and commanding part of the village, overlooking the lake. It still remains the most popular hotel with the English, although there has never been a time that complaints have not been made about the food there. But Herr Badrutt, though a pillar of the Republic, and, I have no doubt, a democrat outside his own house, is a severe autocrat within it, and knows how to suppress disaffection with a strong hand and a stern countenance.

At present there are about ten hotels and twice as many good *pensions* and villas at St. Moritz.

One ought, of course, to feel grateful for all this increased accommodation, but at the same time one cannot help feeling some regret at the departure of that simplicity of life which lingered so long in this long neglected corner of eastern Switzerland.

I like to remember, though with a certain sadness, that when I first visited St. Moritz, being unable to find a room in the hotel, I was provided with one in

the village, which was very comfortable, save for the odours which penetrated it, and which appeared, from their nature, to proceed jointly from a cow-house and a cheese-store. It was then the custom in the Engadine, even in houses which had a very showy appearance externally, to devote a part of the ground-floor to the accommodation of the live stock—cows, goats, fowls, etc.—and to stores of various kinds; so that emanations from the occupants of the ground-floor had to be tolerated by those who occupied the upper storeys. And I lived in the odour of cows for two days, till I received intimation that the room destined for my reception in the hotel was vacant, and I at once took and kept possession for the remainder of that season at St. Moritz of a very pleasant little room in the new wing of the hotel, with two windows, one looking over the bright green lake and on to the wooded mountain-side opposite; the other overlooking the Kurhaus, and up the valley to the great Cima di Margna.

The Upper Engadine scenery is by no means seen at its best from St. Moritz, and the farther we go eastward, along the valley, the less interesting it becomes. A writer in "*Fraser*," who evidently knows Switzerland well, speaks in somewhat disparaging terms of the Upper Engadine.

He says: "The upper valley of the Inn is one of the very few Alpine districts which may almost be called ugly. The high bleak level tract, with monotonous ranges of pine-forests, at a uniform slope, has as little of picturesque as can well be conceived in the mountains. Even in the great peaks, there is a singular want of those daring and graceful forms, those spires, and domes, and pinnacles which give variety and beauty to the other great mountain masses." This is true enough of that part of the valley which extends from Samaden to its termination in the Lower Engadine, but it scarcely does justice to the neighbourhood of St. Moritz; while

around Campfer, Silva Plana, and Sils, with its chain of Alpine lakes, the scenery is as beautiful as it is unique.

For those who are able to walk well, there are attractive and interesting mountain excursions of all degrees of arduousness. "The frequented and inhabited valleys of this region," writes an "Edinburgh" Reviewer,* "are so high above the sea-level, that the visitor is already on a platform of from 5000 to 6000 feet, even in his inn. Hence he starts from a 'coign of vantage' for ascents, and is invigorated by sleeping in the purest and keenest air. He must not be surprised to see snow falling in the middle of July, or to experience a cutting blast after sunset which would do no discredit to December in Britain. We have been well-nigh chilled to death on an August evening while gazing at the Norwegian-looking lake of St. Moritz, from the village of the same name, which itself stands at an elevation of 6000 feet above the sea.

"From this explanation it will be at once understood that mountaineering in this region becomes comparatively facile in relation to some particular summits. The finest and most accessible of all the famous views is that from the Piz Languard, and it is hard to refrain from enthusiasm in adverting to it. From this summit of 10,715 feet above the sea-level, if one has but a cloudless sky—an exceptional advantage, which we enjoyed in two ascents—spreads out to the eye, certainly one of the most extended, if not actually the most comprehensive, circle of snow-mountains to be seen from any one Alpine observatory of equal altitude.

"The distinguishing feature of this view is the multitude of snow-crowned summits on all sides, rather than the massiveness of many on one side, although it includes the imposing Bernina range.

* July, 1869.

Every kind and shape of mountain seems to rise up and roll away into dim distance and indistinct azure. A whole day would be too brief to count and identify the several peaks, and the two or three hours of clear morning sky, ordinarily permitted, seem to fly away like minutes. A vast and varied relief mountain map is perhaps the best verbal description of the view. If all the world's icy kingdoms and the glories thereof were to be imagined as visible from one pinnacle, assuredly the Languard would be its nearest representative. From the tops of Mont Blanc and Monte Rosa we embrace a far larger circle, but from neither one a panorama so distinct and so appreciable in details as that from the Languard. The altitude is sufficient to command a vast view, but not so extreme as to dwarf the visible mountains. Every candid mountaineer will confess that a height of about 10,000 feet is best adapted to a panoramic view. We may see more from a greater altitude, but we distinguish less definitively.

“Pontresina or Samaden, the latter having a capital inn, is the spot we should specially commend to tourists of moderate physical ability, who desire new and grand Alpine views from points of ordinarily possible attainment. Some visitors, indeed, regard it with particular, and perhaps overweening, partiality; yet its future wide popularity may be safely prophesied. Not its least attractions are its remarkably invigorating air, and the old Valtelline wine there to be drunk. Some will delight themselves in its rich flora; and the little green-shuttered windows of several of the natives of these villages and towns are filled with bright flowers. Those who desire ice-work without danger may easily walk over a great portion of the Morteratsch glacier, towards the bend of which a very grand near view of the Bernina mountains is obtained. Near the foot of the glacier is one of the most beautiful of waterfalls; while from the roadside, amidst rocks and firs, a view of the glacier is gained, which never fails to elicit

enthusiastic admiration. The easy walk up the fine Roseg valley presents striking wood and rock views, with a beautiful termination of glaciers ; while athletic mountaineers have before them excursions, including every degree of difficulty, up to the ascent of the highest peak of the Bernina, a height of 13,294 feet, which is of difficult and laborious attainment. The Piz Morteratsch, which is 12,316 feet, is a safe and, comparatively, not difficult expedition, while the view is probably nearly as impressive as that from the highest peak."

The village of St. Moritz is the highest in the Upper Engadine, and the projecting ridge of rock upon which it is built is on this account termed the "Engadiner Kulm." The highest part, where the Kulm Hotel stands, is placed at an altitude of 6100 feet above the level of the sea, the general bed of the valley being about 300 feet lower. Green grassy meadows descend in gentle slopes from the village to the N.W. shore of the beautiful little lake, the St. Moritzer See, which stretches across the valley to the wooded foot of the Piz Rosatsch, a huge mountain mass, which rises steeply on the opposite shore of the lake, its base covered with larch and pine trees, and its summit overhung by a great glacier mass. Herr Badrutt's hotel is built so as to command one of the finest views in this part of the valley. Standing on the terrace of the hotel, directly opposite, rises the aforesaid Piz Rosatsch ; to the right the view stretches far up the valley towards the Maloya Pass, overlooking the Kurhaus and its grounds, catching a glimpse of the series of lakes which extends up to the head of the valley, and forms one of its greatest beauties ; and finally the eye rests on the gigantic outline of the Piz Margna, always a conspicuous object in this direction. Turning to the left, the view is extremely beautiful : the rich green meadows at the eastern end of the lake, with the dark pine woods, which thickly cover the gentle elevation,

concealing the village of Pontresina on the other side of it, form a pleasant foreground; while directly behind Pontresina rises the great mountain-range which lies to the S.E. of the Bernina Road, and amongst which the pyramidal summit of the Piz Languard is a striking object. Still farther to the left the rest of the upper valley of the Inn opens out—the white villages, the winding river, the somewhat bare-looking mountain-sides—at the end a grand mountain-range, whose wonderfully bold and rugged summits seem to close the valley in this direction, and they do indeed form the natural boundary of the Upper Engadine. Few mountain masses that I have ever seen look more beautiful than this, when it is lit up by the rays of the setting sun. There is a variety and a warmth of colouring, and a grandeur of outline about its rocky masses, which have at certain times seemed to me more striking than some of the finest snow-covered summits.

Behind St. Moritz, to the N.W., rises the Piz Nair, a mountain very easily ascended; and continuous with this, towards Samaden, rise the neighbouring summits of Piz Padella and Piz Ot. In the opposite direction, towards Campfer, is seen the triangular pyramidal summit of the Piz Munteratsch, a mountain which rises on the eastern side of the Julier Pass.

The village of St. Moritz itself is not attractive. It is built in an irregular, untidy, scrambling way, along the hillside, with narrow dirty streets, and a terribly rough and jolty pavement. It is the least tidy and neat of all the Engadine villages I have seen. Some decent-looking houses have been built on the outskirts of the village, for the accommodation of visitors, and a pretty little Catholic church, and a house adjoining for the priests, have been erected just beyond the Kulm Hotel, on the road towards Samaden. A very pretty little English church, the site for which was given by Herr Badrutt, and the foundation-stone laid in 1868 by the Archbishop of York, has been

built in a convenient situation, about midway between the village and the baths. Our countrypeople are indebted for this edifice mainly to the exertions of the Rev. A. B. Strettell, the English chaplain at St. Moritz, who, besides founding the chaplaincy there, was chiefly instrumental in procuring the erection of this church, and has been unremitting in his efforts to improve it and beautify it since its completion.

But to turn from matters general to matters medical.

Most of the visitors at St. Moritz come for the purpose of going through the "cure" there. This consists in drinking the waters and bathing in them.

These waters are mildly chalybeate, the amount of iron contained in them being comparatively small, as will easily be seen by comparing them with other well-known chalybeate springs :

	Carbonate of Iron.				
St. Moritz	0'25
Spa	0'37
Tunbridge	0'39
Pymont	0'42
Schwalbach	0'64
Orezza	0'80

It is here seen that even the Spa water contains a larger proportion of iron than the strongest of the St. Moritz springs, while the Orezza water contains nearly four times as much. The water of the Orezza spring is also abundantly impregnated with carbonic-acid, and I believe, as it becomes better known, it will be largely used. The spring itself is unfortunately situated in the island of Corsica, and on that account it is not likely to be much drunk at its source ; it is, however, exported in considerable quantities, and has long been in general use in Paris.

The following is the detailed official analysis of the water from the two sources drunk at St. Moritz. There is also a third source, but that has not yet come into use for drinking. One of these is termed the "Paracelsus," and the other the "Alte Quelle."

IN 1000 GRAMMES.

Gaseous Constituents.

	Alte Quelle. Grammes.	Paracelsus. Grammes.
Carbonic acid	2'5485	2'5220
Nitrogen	0'0047	—
Oxygen	0'0015	—

Solid Constituents.

Carbonate of lime	1'0460	1'2832
" magnesia	0'1911	0'2412
" iron	0'0327	0'0454
" manganese	0'0059	0'0059
" soda	0'2694	0'2935
Chloride of sodium	0'0389	0'0404
Sulphate of soda	0'2723	0'3481
" potash	0'0164	0'0205
Silica	0'0381	0'0495
Phosphoric-acid	0'0004	0'0006
Alumina	0'0003	0'0004
Bromine, Iodine, Fluorine	traces	traces
Total of solid constituents	1'9113	2'3287

The water is strongly charged with carbonic-acid, which makes it sparkling and pleasant to drink. It also has a distinctly chalybeate taste, and is of rather low temperature—3'5 degrees Réaumur, equal to about 40 degrees Fahrenheit.

A non-medical writer remarks of the St. Moritz waters :*, "They are delicious—far too nice for medicine, though they are said to perform great cures. They combine the finest flavour of the best soda and seltzer water iced. There is a keen refreshing edge to them which spreads all over your being, and sharpens you up at once."

Practically these waters may be regarded as containing a small quantity of iron, about three grains of the carbonate in a gallon of the stronger source, and a considerable amount of carbonate of lime, about eighty grains in a gallon, held in solution by an abundance of carbonic-acid.

* The author of "The Regular Swiss Round."

The presence of this large amount of carbonate of lime, in the absence of any appreciable amount of aperient saline constituents, interferes somewhat with the usefulness of this water in many cases where the use of a chalybeate is indicated.

The history of these mineral springs is of most respectable antiquity, although their celebrity in our own country is of recent date.

About six-and-twenty years ago, an English clergyman staying at Schwalbach heard of the existence of a very similar spring at St. Moritz, and wishing to exchange the somewhat sultry summer atmosphere of the former place for the more bracing influence of mountain air, came for the first time into this now popular watering-place, and found only two English people there ; and indeed, so far as our own countrymen were concerned, it was at that time practically unknown as a health resort.

Germans, Swiss, Italians, had long known of the virtues of its waters or of its mountain air, or of both together, and annually came in considerable numbers to go through the regulation cure ; but it is only within the last fourteen or fifteen years that the place has been at all well known to English physicians. Mrs. Freshfield's charming little book, entitled "*A Summer Tour in the Grisons, and in the Italian Valleys of the Bernina*," which was published in 1862, was one of the first publications which drew the attention of English tourists to the, at that time, unfrequented upper valley of the Inn.

It would seem, from recent discoveries, that the Romans were acquainted with these springs, and made use of them during their occupation of the country ; but the earliest written account of them belongs to the sixteenth century. In the year 1539, Theophrastus Paracelsus, a physician of Hohenheim, wrote thus : "*Ein acetosum fontale, das ich für alle, so inn Europa erfahren hab, preiss, ist im Engadin zu Sanct Mauritz, derselbig laufft im Augusto am sauristen ; der desselbigen Trankes trinket, wie einer Arztnei gebürt, der*

kann von Gesundheit sagen." Paracelsus is, in consequence, held in great honour at St. Moritz, and the principal well is named after him. Since 1680 the waters have been exported, and so long ago as 1703 the springs were frequented by Germans, Italians, and Swiss. At one time the waters were collected in the hollowed-out trunk of a huge larch-tree, which was discovered during the excavations made in 1852, for the purpose of cleaning out and utilising the new source, and improving the supply from the old one. The workmen were not a little astonished to come upon a great wooden tube, which further exploration proved to be formed of the trunk of a larch-tree artificially hollowed out. This was evidently the ancient conduit of the mineral source.

It was cleared of the earth and rubbish with which it had become filled, and the explorers were delighted to perceive that the clear and sparkling mineral water gushed forth in nearly ten times its former quantity, and of purer quality; since the ancient conduit had served, and had been doubtless designed especially, for the purpose of protecting it from contamination and dilution by the common surface water.

About fifty years ago (1817) there was only a little pavilion or shed built immediately over the spring, and there was no kind of shelter provided for the drinkers. Three little "Trinkhalles" were subsequently built, and these lasted up to the year 1832. In that year a sort of "Établissement des Bains" was built, consisting of baths and a drinking-house, with a few bedrooms—simply, however, for resting in, after taking the baths. At this time, all the patients lived at St. Moritz, and had to take a twenty-minutes' walk before they reached the baths.

In 1854 a company hired the spring of the commune for fifty years, on the condition that they should build a large bath establishment, with a dwelling and boarding house in the immediate neighbourhood of the spring. This building, commenced

in 1854, was finished in 1859; and in 1866 the large and convenient Trinkhalle, which extends from the Alte Quelle to the Paracelsus Quelle, was added. There is accommodation in the Kurhaus for about three hundred guests; the bedrooms are many of them very small, but there are spacious and comfortable apartments for those who can afford to pay a high price for them. The dining-room is very large and handsome, and capable of seating three hundred persons. There are also *salons*, and reading, coffee, billiard, and smoking rooms. Besides the Kurhaus there are many good hotels now built, conveniently near the baths and springs. I must now enter into some medical details as to the proper use and applicability of the St. Moritz cure.

Twelve years ago St. Moritz was a watering-place of such recent growth, so far as our own country-people were concerned, that at that time much doubt and misconception existed amongst English physicians as to the precise character of the illnesses in which the "cure" at St. Moritz might most appropriately be recommended. Their difficulties were further increased by the reception of most conflicting accounts from different patients who had been sent there. Some returned assuring them that, of all places in the world, St. Moritz was the most delightful, the most invigorating and health-restoring they had ever known. Others gave a most gloomy account of it: they came back no better, or even worse, than when they departed; they had shivered all through August, they were never warm except in their beds, they had been nearly starved for want of decent food, and they had been bored to death by the unutterable dullness of the place. Since then things have greatly changed. I may perhaps be allowed to have had a small share in providing data for the better discrimination of suitable cases to be sent there: but there are now few English physicians of eminence who have not visited St. Moritz themselves, and seen and judged

for themselves of its merits and uses. The accommodation for invalids, which was at one time very indifferent, is now so good as to leave little to be desired.

Before I state my own views, I will quote briefly the opinions of the Swiss physicians as to the nature of the cases in which a residence at St. Moritz is likely to be beneficial or otherwise, as well as the method of drinking and bathing which they were in the habit of prescribing.

In the first place, conditions of general debility are mentioned, whether arising from constitutional tendency, or from overwork, or from attacks of exhausting diseases; and especially those debilitated states which often occur in females from special causes.

In cases of slow recovery from the effects of typhus, typhoid, and intermittent or malarious fevers. In certain cases of delicacy of the skin, with a disposition to take cold, to rheumatic affections, and to exhausting perspirations.

In chlorosis of young people and in anæmia generally—that is to say, in all cases of blood degeneration—and especially in those cases of chlorosis which are accompanied with cardialgia (heartburn). When there is great irritability of the stomach, with a tendency to eructations, it is recommended that the water should be mixed with whey.

In chlorosis associated with nervous irritability—a most distressing and unfortunately common condition—in addition to drinking the waters, the cool carbonic-acid baths are said to be especially calmative. The anæmia which follows as a result of repeated hæmorrhage is treated successfully by the waters and baths combined.

Nervous affections, associated with weakness of the circulating organs, or with general debility, of which the following are especially named: Migraine, pain in the eyes, palpitations, uterine neuralgia, hypochondriacal conditions.

Certain special forms of weakness, when unconnected with disease or injury of the spinal cord. Such cases improve greatly at St. Moritz.

Many derangements of the digestive organs, cardialgia, slighter forms of chronic gastric catarrh, the atony left after vomiting of blood, when all inflammatory conditions have passed away.

In hæmorrhoids, when considerable loss of blood has led to great exhaustion, and when they are unconnected with any organic disease.

Certain maladies peculiar to the female sex.

In vesical catarrh, worms, atonic gout, scrofula.

In convalescence after all severe diseases.

Such are the numerous and various disordered conditions which the Swiss physicians state will be benefited by a sojourn at St. Moritz and by taking the waters there.

They also mention certain diseases in which this "cure" is counter-indicated. They are—Convulsive, nervous disorders in plethoric and vigorous constitutions, excitability of pulse and disposition to general plethora, frequent throbbings in the breast and head, threatened apoplexy, hæmoptysis, organic diseases of the heart, tendencies to active hæmorrhage, all forms of cancer, epilepsy, and violent hysterical conditions in plethoric persons.

The routine of drinking and bathing prescribed by the physicians of the place used to begin between six and seven in the morning. At this early hour groups of promenaders, wrapped up warmly, and braving the chilly morning air, might be seen briskly pacing up and down the gravel paths in the ornamental ground in front of the Kurhaus; a select band of instrumentalists—the so-called "Kurmusik"—endeavouring with feeble strains to enliven the monotony of the occupation.

Ever and anon the promenaders disappeared into the Trinkhalle to take their dose of water. This is a convenient building, in which the waters are dispensed. A boy stands at a pump, and pumps up the water

as it is required. On the walls of the pump-room are racks of pigeon-holes, containing the glasses of the patients, and to each pigeon-hole the name of the drinker is affixed. Near the pump-room you ascend by a few steps to a covered promenade, surrounded with comfortable lounges, and provided with reading and work tables. There are also several stalls for fancy articles on one side of this covered space. Those who are ordered to drink from the weaker "*Alte Quelle*" have to carry their glasses with them to the end of a long corridor, where the water of this well is pumped up in a similar manner.

A fee of twelve francs has to be paid on inscribing one's name on the *Kurliste*, two francs of which go towards the maintenance of the *Kurmusik*.

Patients are ordered to begin with one or two glasses, and increase to four or six glasses daily, and to walk for a quarter or half an hour after each glass.

Later in the day, generally after breakfast, the baths are taken. These are regarded as an essential part of the cure, and a course of twenty-five baths is said to be necessary in order to give them a fair chance. The baths are heated by jets of steam, which pour through two perforated pipes into the baths. By this means the water can be heated to a considerable degree without any loss of carbonic-acid or precipitation of oxide of iron. By this arrangement, too, a great number of bathers can be furnished with baths at the same time. If hot water simply were added, the carbonic-acid would escape rapidly, and the iron would be precipitated. A threefold system of pipes leads into each bath, one for the conveyance of steam, one for the mineral water, and a third for common water, for the purpose of cleansing the baths. They are generally ordered to be taken at a temperature of 26 degrees Réaumur at the commencement, and gradually reduced to 21 degrees, or even lower. Twenty minutes to half an hour is the time for remaining in the bath.

The water supplied in the baths is derived from

the weaker spring, the "Alte Quelle," the "Paracelsus" or "Neue Quelle" being the one more generally used for drinking. But, owing to the small supply of water compared with the number of bathers, the water of the spring is considerably diluted before it reaches the baths. The baths themselves are also constructed with the view of economising the supply of water as much as possible. They are simply long and narrow wooden boxes, just large enough to receive the body of the bathers. An unusually stout and tall man would find himself straitened for room in one. These boxes are covered in by a movable lid, which fits round the neck of the patient, so that one's head appears outside the box while all the rest of one's body is shut in.

The bathers are accommodated in small wooden compartments, separated from one another by wooden partitions, and arranged on each side of a long corridor. As the steam by which the baths are heated is allowed to escape freely into these corridors, they constantly become filled with a moist, hot, close, and unwholesome atmosphere, to remain in which for more than half an hour must be very injurious to most delicate persons, especially as they enter from and pass out into a thin dry air, often *very many* degrees lower in temperature than the air of the bath-rooms.

These arrangements for bathing do not compare favourably with such admirable ones as are found at baths like Schwalbach, Schlangenbad, Aix, etc.

Let me now proceed to make what I hope I may call a rational inquiry into the physiological and therapeutic action of these waters, when drunk and when used for bathing purposes.

The effect of immersion in water charged with carbonic-acid, a few degrees below the temperature of the body, is not disagreeable. The heat of the surface of the body sets free the carbonic-acid of the layer of the water in immediate contact with it. This accumulates on the surface in minute bubbles, so that the whole of the skin from head to foot, as well as every

little hair, becomes covered with sparkling beads of gas. As the temperature of the layer of water in contact with the body rises (and, in order to favour this, one is particularly cautioned not to move in the bath, but to remain perfectly still), the bubbles of gas expand, and at last part from the skin, and escape at the surface of the water. As each little bubble of gas is set free from the skin it imparts to it a slight tingling effect, comparable only to the effect of an intensely feeble galvanic current; and doubtless its effect on the surface is of this nature. The result is that the skin becomes red and congested. If the bubbles of gas be swept off the skin, they do not reappear. The question is—Can these baths have an active curative influence? Or are they, as some suggest, ordered for the purpose of filling up the time of the patients, and also as a source of profit, since a franc and a half has to be paid for each bath? That they may do *harm*, I fear there can be no doubt.

There are, however, cases in which these baths have a peculiarly soothing effect, since it seems certain that prolonged immersion in warm water, rendered somewhat astringent by earthy matters held in solution, exerts an extremely calming influence in cases of exalted sensibility and nervous irritation; while, in other cases, the stimulating effect of the carbonic-acid on the skin is not without a beneficial influence.

Some persons state that the effect of these baths upon them is to produce a state of intense exhilaration and excitement. But then these are persons of highly excitable nervous temperament. To some the effect of the bath seems scarcely appreciable. The feeling is agreeable, but the exhilarating effect certainly does not surpass, probably scarcely equals, that of an ordinary cold sponge-bath at home.

But if the good these baths do be in many cases problematical, the harm they occasion in some instances is by no means doubtful.

The mere fatigue which the taking these baths occasions in some cases of great general debility and

exhaustion, and the lowering effect on a very weak circulation of remaining for so long a time as twenty or thirty minutes in a bath of any temperature, as well as the breathing, at the same time, the hot steaming atmosphere of the bath-rooms, produce, in many instances, as I had occasion often to observe, a low feverish condition, which it has taken some time to recover from. Especially is this the case in feeble persons advanced in years, who come out of the bath exhausted, chilled, and uncomfortable, and then walk slowly, or perhaps are driven, through an unusually cold air; for it would not matter so much if the baths were taken only on warm fine days—but such days, in a bad season, are “few and far between,” and the baths are taken daily. I say nothing of the absorption of iron by the skin, which is not now seriously maintained by any persons of authority.

Next, as to the routine of water-drinking. It may doubtless be very wholesome for persons who suffer only from imaginary illnesses, or for those who simply have to shake off the effects of the unwholesome excitement of the habitual life of our large European capitals, or for those habitual dyspeptics to whom an entire revolution in their mode of existence serves as a useful alterative—it may be very well for all such persons to be made to get up at six o'clock in the morning, and drink three or four or more glasses of cold water before breakfast, with free exercise in the open air. But to certain cases of real illness which used to be sent to St. Moritz, much more commonly than they are now, such a *régime* was absolutely hurtful. There is, doubtless, a tendency in these watering-places to treat all cases alike; whereas, my own experience pointed out, in the most forcible manner, the necessity of great discrimination in the course to be prescribed for different cases, and I am glad to have an opportunity of stating that the practice of the resident physicians, both at St. Moritz and elsewhere, since they have had more experience of English patients and more intercourse with English physicians,

has been much modified from what it was twelve years ago.

To most persons of languid circulation, with a deficient blood supply, and with greatly reduced muscular power, either on account of slow recovery from severe illness, or from depressing chronic ailments, or exhausting discharges, the effect of a cold douche to the stomach, before any food has been taken, will very constantly interfere with the digestive process for the rest of the day, and give rise to distressing feelings of weight and flatulence in the stomach, as well as troublesome headaches. These are common consequences of the practice of drinking the waters in the early morning. I need scarcely observe, that there are many other conditions in which this process proves refreshing and invigorating. I am only pointing out the absolute necessity of classifying and discriminating different cases of illness.

Patients who have suffered in the way I have just pointed out used to be told by the local physicians to take the water slightly warmed, in order that some of the carbonic-acid might be dissipated, the excess of which, they said, was the cause of the headache. I could not agree with this opinion, because precisely similar feelings of discomfort followed the drinking of water of the same low temperature and at the same period of the day, even though it contained little or no carbonic-acid.

The real explanation of these symptoms is doubtless to be found in the shock which the repeated ingestion of cold fluid gives—in systems, be it remembered, not prone to vigorous reaction—to the branches of the pneumogastric nerves distributed to the stomach, as well as to the great sympathetic ganglia and their ramifications, which are placed in the immediate vicinity of this organ. A remarkable corroboration of this view was afforded me one day at St. Moritz in the person of a gentleman who, having arrived only the night before, walked down the next morning to the spring and drank off a glass of this

very cold water, when he instantly fell down faint on the floor in my presence. This was an extreme example of the effect of the shock of the sudden ingestion of a draught of unusually cold water to a person not in a vigorous state of health.

Twelve years ago I pointed out as the result of observations at St. Moritz, and these observations have been corroborated by other English physicians since, that persons with feeble and impaired digestive powers, associated with a weak circulation, and especially when these conditions were due to chronic, functional, or organic diseases, could not drink a quantity of cold fluid before breakfast, or remain for a *prolonged* period in baths of any kind, without experiencing considerable augmentation of the distressing symptoms from which they suffered, and, indeed, it was very singular that they should ever have been recommended to attempt any such rigorous process of treatment.

I have seen patients at St. Moritz formerly so utterly fatigued and exhausted by the early rising, and the drinking and bathing which followed, as to be quite incapable of any further exertion for the rest of the day. Moreover, it is no new observation, that repeated immersion in baths for longer than a few minutes at a time has a very enervating influence in many conditions of general debility; and repeated confirmations of this experience also came under my observation at St. Moritz. On the other hand, in conditions of nervous excitement or irritability, the baths doubtless have a soothing effect; but even in such cases it is questionable whether they should be long persevered in. As to the suggestion that there is some particular reason why a certain fixed number of the baths should be taken, be it eighteen, or five-and-twenty, or any other number, greater or less, all that can be said is that it is often good to have some *definite* plan to follow, but there is no particular efficiency in any particular number. Yet it is curious to consider that this tendency to believe in the efficacy

of repeating a process a particular number of times is deeply rooted in the human mind. "Go and wash in Jordan *seven* times" was the direction of the prophet to the leper!

It was remarkable to me to observe the heroic perseverance with which some persons pursued the *régime* they had been directed to follow, notwithstanding the irresistible conviction that they were losing and not gaining ground. But then they had come all the way from England on purpose! At length some became really ill; and then the very immediate improvement in health, which was observed to follow in many instances the giving up the bathing and drinking, left no manner of doubt in my own mind that the *chief* health influence in the place was the pure, clear, bracing mountain air. I must not be understood to say that I think the bathing, and especially the drinking the water, useless; on the contrary, I believe them to be of great value in many instances: all I wish to insist upon is, that many, very many, persons used to be sent to St. Moritz who would have done better without any of the waters and without any of the baths; and there are others to whom the waters may be useful, but who are not strong enough to rise at the early hour of six, or to drink them before breakfast. For all such the hours of eleven and five are the best for drinking, and a third glass may be taken of the bottled waters before going to bed.

Since I first knew St. Moritz it is remarkable how many persons have taken to the hour of five p.m. for drinking. It is an excellent hour; after the afternoon walk the glass of water is refreshing, and taken just about an hour or so before dinner it does not disturb digestion, and tends to promote appetite.

There are two methods of judging of the therapeutic action of the St. Moritz mineral springs. One is by a process of rational deduction from the known effects of the ingredients which enter into their composition. The other is by the direct observation of

their effects on those who drink them. Both are valuable; but the former is necessarily the more exact of the two, since in the latter method the effects observed may be due to other causes than the employment of the waters, and notably to the influence of the mountain air, and the entire change in the habits of life of the patient.

I shall limit myself, then, at present to the inquiry as to the probable physiological action of these waters on the human economy. It is not unimportant, in the first place, to consider what the effect may be of drinking daily a large quantity of water simply, apart from the mineral substances which it holds in solution, especially in the cases of persons unaccustomed to the use of pure water as a common beverage. This is a part of the inquiry very commonly omitted, yet it cannot be doubted for a moment that the admission of from one to two pints of an influential physical agent like water into the alimentary canal every day, in opposition to ordinary habit, must have a very decided influence on the health of the body. Let us imagine, for instance, a typical alderman, or a chairman of a city company, or even a diner-out of more moderate capacities; let us imagine, if we can, the amount of food and drink, of turtle, salmon, whitebait, venison, champagne, burgundy, sherry, port, hock, etc. etc. etc., in excess of their requirements, in actual hurtful excess, taken by such persons between Christmas and midsummer of every year. Conceive the residua of all these excesses lurking about the human body, in the blood, in the secretory organs, in the crypts and corners of the alimentary tube; and consider also how little pure water has found its way along the same channel during the same period. And yet it is necessary to perfect health that the interior of our bodies should be washed and made clean, as well as the exterior.

Put such a person on a daily dose of a pint and a half of pure water, for three weeks or a month; restrict him at the same time to a moderate and

limited supply of food, and make him take plenty of active exercise in the open air; the effect will assuredly be to eliminate from the body, from the alimentary canal; from the blood, through the secretory organs, a certain amount of waste or hurtful material, the retention of which in the body might prove in time provocative of chronic functional derangement, or even of organic disease.

The necessity for an occasional course of this kind applies to most persons, except the most abstemious and self-denying. In the course of a year the blood may well get somewhat tainted with the products of impure food and faulty digestion, and the alimentary canal may also be the better for a little flushing, to clear away the accumulated débris which its ordinary action has not removed; and the blood will itself be purified by the continued absorption and elimination of a considerable quantity of an important solvent like water. Water is rapidly absorbed into the blood, and also rapidly discharged from it. In its rapid passage through the blood and the tissues of the glands, by which it is finally thrown off, it will carry away, dissolved in it, substances which were harmful to the economy, and which only needed an excess of this solvent in order to be eliminated by the channels of excretion.

But when the water that is drunk contains saline aperient salts, then its depurative action is more remarkable. In that case we have the advantage not only of the solvent action of the water, but also of the stimulating action of the compounds it contains, on the organs of elimination, and especially on the glands of the alimentary mucous membrane. It is for this reason that we send those, whom we know to have lived freely, to flush their alimentary canals, their main-drainage tubes, as it were, at such springs as those of Carlsbad, Homburg, or Tarasp. The most satisfactory results constantly follow this cleansing process. The advantage of such purgation in aiding the operation of the intellectual and imaginative faculties is not

perhaps generally known or admitted ; yet we have no less considerable authority than that of Dryden and of Byron on this point. Dryden says : " When I have a grand design, I ever take physic and let blood ; for when you would have pure swiftness of thought and fiery flights of fancy, you must have a care of the pensive part ; in fine, you must purge the belly." And Lord Byron observes : " The thing that gives me the highest spirits (it seems absurd, but true) is a dose of salts ; but one can't take them like champagne." And we have far more ancient testimony to the same effect. We are told that " Carneades, one of the most famous disputants of antiquity, was accustomed to take a copious dose of white hellebore, a great aperient, as a preparation to refute the dogmas of the Stoics."*

There is, therefore, one consideration common to all the springs at which we send our patients to drink, and that is the quantity of water we thereby induce them to consume. In those cases where we desire also to exert some stimulating effect on the secretory organs generally, and especially on the liver, and on the intestinal mucous membrane, we certainly ought not to prescribe a course of the St. Moritz springs, and for the following reason : The St. Moritz water is constipating, and it has this effect in virtue of the very (comparatively) large amount of chalk which it contains—nearly ten grains to the pint. Many other mineral springs contain as much chalk as those of St. Moritz, but then very many of them contain also a considerable quantity of aperient salts, which counteract and overcome the constipating effect of the carbonate of lime, which then acts beneficially as a simple antacid.

The only secretion which the St. Moritz water increases is that of the kidneys, which of course *must* be increased by the ingestion of a large quantity of fluid, none of which passes off by the bowels. It is on account of this tendency of the St. Moritz waters to

* Disraeli's "Curiosities of Literature," under "Medicine and Morals."

check the secretions, especially those of the liver and the intestinal canal, that persons suffering from chronic hepatic congestion, from obstinate constipation, and from visceral obstructions generally, are often made excessively uncomfortable when they attempt to follow the course prescribed there. The dryness of the mouth and throat complained of by some while drinking these waters is referrible to the same cause. On the other hand, this astringent and bracing constituent proves of considerable use in cases of a different type; this is especially observable in those persons whom we designate as of leuco-phlegmatic temperament: pale, lax-fibred, languid people, who commonly suffer from relaxed mucous membranes, chronic mucous discharges, and sometimes from passive hæmorrhages; a tendency to constipation may also exist in such cases, but then it is due rather to atony of the muscular fibre of the alimentary canal than to a deficiency of secretion.

Cases of chronic diarrhœa, not of a dysenteric character, but rather dependent on an irritable condition of the intestinal mucous membrane, and often associated with excitability of the nervous system, are treated successfully by these waters. The abundance of carbonic-acid in the St. Moritz springs is doubtless advantageous. There need be no great mystery however as to its action. Water charged artificially or naturally with carbonic-acid, forms the commonest of beverages throughout Europe. Such waters are grateful to the palate, and refreshing and invigorating to the system generally. In irritable conditions of the gastric mucous membrane they act as a sedative to that organ; we can therefore readily believe that cases of gastric catarrh, with acid eructations, are relieved by drinking these waters, containing as they do the alkaline carbonate of lime and the sedative carbonic-acid.

Carbonic-acid acts also in an important manner as a solvent; it holds in solution the oxide of iron and the large quantity of lime in these waters; it promotes their absorption into the blood. This brings me to

the consideration of the most important ingredient in the St. Moritz springs, viz. the iron. Here arise two practical questions: First, why is iron so essential to us? and, secondly, why do we go all the way to St. Moritz for it? To answer the first question is very easy, but it is not quite so easy to answer the second.

It has long been known that when persons become pale, from loss of blood or other causes, the natural colour may often be restored by the administration of medicines containing compounds of iron, or even the metal itself reduced to fine powder. This is the observed fact; now for the reason. The blood is the nutritive fluid of the body. In countless streams of liquid living food, it flows through nearly every tissue of the body. The precise manner in which the food passes from the blood into the tissues of the body and becomes incorporated with them is not clearly known to us. But the blood not only conveys nutrient matter to the tissues of the body, it serves also as the medium for the conveyance away, from the tissues, of the substances formed by their decay and disintegration—a process which is continually going on. Every one of the finest bloodvessels of the body not only brings a supply of food to the portion of tissue which surrounds it, but it acts also as a minute drainage pipe, to carry off the waste products of the life and activity of that particular portion of tissue. We can easily see from these considerations how essential it must be to the health of the body that the integrity of the blood should be maintained. It must neither be defective in quantity nor quality.

There are many circumstances, which I need not enumerate, but notably the direct loss of blood by hæmorrhage, that may have the effect of altering the quality and diminishing the quantity of that fluid. When this is the case, it becomes the duty of the physician to attempt to increase its quantity, and to restore its quality. One of the most important changes which the blood undergoes in the way of

deterioration is the loss of a portion of what we call its *red corpuscles*—minute microscopic cell-like bodies, of which there have been calculated to be five millions in a cubic millimetre of human blood, and that rather more than ten millions of them would lie on a space one inch square. Now it would appear that these little red corpuscles are probably the instruments or agents of nutrition; that they are the busy workers in the blood, building-up and pulling-down with equal industry, while they they themselves die and are replenished continually. Chemical examination shows that the metal iron is an essential constituent of red blood-corpuscles; and, therefore, a certain supply of iron is needed for their constant formation. For ordinary purposes we obtain a sufficient supply in our usual food, the flesh of animals, etc.; but when an extraordinary supply is required for the rapid manufacture of much-needed red corpuscles, then we have to give iron in the form of medicine. It is on this account that, in medical language, we call iron a blood restorative. In those cases in which it is necessary, the demand for it is imperative, and nothing else can supply its place. That it acts by restoring the red blood-corpuscles we have abundant proof: in the first place, we constantly see the colour and freshness return to pale faces and blanched lips during its administration; and in the second place we have carefully examined the blood with the microscope in such cases. In less than a month the quantity of red corpuscles has been found to increase from 50 to 76 parts in 1000 parts of blood, while the patient has been taking iron medicines. Yet the amount of iron in the whole body is but small. According to some physiologists, there are about 100 grains of metallic iron in a man weighing eleven stone. A sentimental Frenchman, having lost a friend to whom he was much attached, caused the body to be burnt, and having extracted the iron from its ashes, converted it into a mourning ring, which he wore in memory of the dead!

Although there is only this small quantity of iron in the human body, we occasionally find great difficulty, notwithstanding all the varieties of iron medicine at our disposal, to induce the system to take up and appropriate any portion of that which we are constantly supplying it with. This brings me to the second question, viz. Why do we send patients all the way to St. Moritz, to get a few additional grains of iron, when we can supply it so abundantly at home? The truth is, that in some instances the power of assimilating the ordinary compounds of iron appears to be absent, and we send patients to St. Moritz not for the sake of the iron in the water merely, but that they may recover the power of assimilating this substance. This object the mountain air and the active out-of-door life in many cases effect.

There is also another reason. Of all the compounds of iron, the carbonate of the protoxide, when held in solution by carbonic-acid, is the one most easily assimilated, and it is in this form that iron exists in most mineral waters. I have already pointed out that the St. Moritz water is unsuited to some persons who require iron, on account of its constipating rather than aperient character, and it is a matter of the commonest experience that iron salts are useless, and produce discomfort in many cases, unless combined with laxatives. This is especially the case in *commencing* an iron course.

Now the mineral waters of Tarasp, some of the springs at Homburg, and in a minor degree those of Kissingen, supply the combination of chalybeate and aperient; and it is for this reason that it is often advantageous to begin the iron course at a place like Homburg or Tarasp, and finish it at St. Moritz. It is also useful while drinking the waters at St. Moritz to take an occasional aperient in the form of a bottle of the Tarasp water or a seidlitz-powder, or some other simple medicine.

But the quantity of iron in the Paracelsus spring is so small—only about the third of a grain in a pint—

that when any great deficiency of iron in the blood exists, a large quantity daily for a long time is needed to supply this ; and I have already pointed out that in great debility of the digestive organs, so much fluid cannot be absorbed without considerable disturbance of the general health. In such cases I have seen the plan of adding some of the ordinary preparations of iron to the iron-water answer admirably.

I must again remark that I am particularly anxious not to be understood as laying down general laws—that is quite impossible in an investigation of this kind ; but I am endeavouring to make clear why it is that the St. Moritz course is so successful in some cases and not in others. To sum up : The cases that appear to derive most marked improvement from the waters and air of St. Moritz are that very numerous class of lax-fibred, leuco-phlegmatic, hysterical women, who commonly suffer from chronic mucous discharges, or passive hæmorrhages, or other functional diseases. The improvement which is observed in some of these cases is rapid and remarkable. Cases of nervous irritability and nervous depression in both sexes, arising from over-work or over-excitement, or from merely constitutional tendency, often derive very considerable benefit from following the course prescribed for them there.

Cases of chlorosis and anæmia in young women, who fail to improve under chalybeate medicines at home, as well as those distressing nervous conditions which so commonly accompany the climacteric period of middle age, are often very remarkably benefited by a short residence at St. Moritz. Certain persons of sanguine and bilious temperament do not so well there. The very dry and stimulating air and the astringency of the waters are not favourable to such persons. In cases of hepatic derangement, the waters of St. Moritz generally do harm, since they tend to arrest rather than promote secretion.

Cases in which there is a tendency to pulmonary emphysema are not adapted to this great altitude.

The air seems too thin, as it were, to satisfy their respiratory requirements, and they are consequently unable to make as much physical exertion there as they could in a less rarefied atmosphere.

I have yet to speak of St. Moritz from a purely climatological point of view, and this is a most important part of the subject. The general question of the influence, beneficial or injurious, of the climates of different parts of the world on healthy or diseased human beings, is one of the greatest interest to the practical physician. It is one, also, in which the welfare of the general public is very intimately concerned, for many valuable lives have been prolonged by a wise and judicious removal from the action of climates which were clearly imperilling their existence.

The question, then, of a cure by climate is one which constantly arises in medical practice, and it is often the only one which leaves any hope of success. The importance therefore of sound and correct views as to the exact nature of the climate of our chief health resorts is obvious.

The investigation, however, of the beneficial influences of the different places that have been put forward as "climate cures," is by no means free from difficulties; and not the least of these is found in the unfortunate but unavoidable circumstance, that the personal interests of a great number of individuals become more or less intimately associated with the success or non-success of the localities in question. So that we must always be prepared to meet with a certain amount of exaggeration, and a certain amount of concealment. We are further constantly embarrassed by the over-brilliant descriptions of the constitutionally enthusiastic, as well as by the dismal accounts of the constitutionally discontented.

All observers agree that one of the chief characteristics of the climate of the Upper Engadine is very sudden and great diurnal variations of temperature. The thermometric variations in the same day are often so very considerable that in summer a temperature

below freezing-point will be registered, and on the same day a temperature of from 40 to 50 degrees above freezing-point; while a westerly wind in the winter will cause the thermometer to mount from — 13 degrees Fahrenheit to + 42 degrees Fahrenheit! — a range of 55 degrees. These sudden changes are admitted by the resident physicians to induce, even in the acclimatised, attacks of inflammation of the lungs, of pleurisy, of chronic rheumatism, and of catarrhal fever.

The early morning is generally cold and damp, as there is a strong dew-fall, but the damp fogs which are common in the lower Swiss valleys are almost unknown at this great elevation. The midday is often very hot, as the sun's rays act very powerfully, owing to the perfect clearness of the sky, and the thinness and purity of the air. The evenings again are cold; but on some few nights in the height of summer, when the south wind comes over the mountain-passes from the plains of Italy, the air becomes positively warm.

On such a night, at the end of August, we picnicked on the hillside, between St. Moritz and Campfer, till eight o'clock in the evening, and afterwards basked in the brilliant moonlight on the terrace of the hotel until after midnight. These still summer moonlit nights in the Upper Engadine are full of a calm still beauty almost unearthly.

Speaking generally, there is in the Engadine a short and temperate summer, and a long and very cold winter. Formerly very exaggerated ideas were current as to the cold of the Upper Engadine in summer. Persons who had only spent a day or two there, or who may have remained longer, but who had encountered an exceptionally cold season, brought back with them accounts of the rigour of its summer climate, which a longer experience could not fail to have modified. I have known invalids who had passed some portion of nearly every day in July and August reclining on a couch in the open air, on one

or other of the terraces of the Kulm Hotel. Of course on many days in order to do this it was necessary to wrap up warmly.

From a series of meteorological observations, continued over many years, at Bevers, near Samaden, by M. Krättli, the following facts have been taken :

The mean annual temperature of the Upper Engadine is 36·5 degrees Fahrenheit. The mean for the three summer months of June, July, and August, 50·8 degrees Fahrenheit ; for the three winter months of December, January, and February, 17·5 degrees Fahrenheit ; for the three months of spring, March, April, and May, 35·4 degrees Fahrenheit ; for the three months of autumn, September, October, and November, 37·8 degrees Fahrenheit. The two extremes of temperature observed by M. Krättli (in 1854) were - 25·8 degrees Fahrenheit, or 57·8 degrees of frost in February, and 79·7 degrees Fahrenheit in July. In November and December there are usually thick fogs, but the three first months of the year are generally calm and clear, and the sunsets and sunrises are said to be most magnificent.

For five months in the year the snow covers the ground to the depth of two or three feet, and the lakes are covered with ice several feet in thickness ; snow occasionally falls in summer. M. Binet Hentsch states that he saw the valley white with snow on the 2nd of July, 1857, and that on the 3rd of August, 1858, he had broken ice on the banks of the Inn ; and I have myself seen the valley covered with snow on the 4th of August : but an occurrence of this kind is usually followed by a spell of very fine bright weather.

The extreme dryness of the air renders the cold in winter less insupportable than it otherwise would be. The normal barometric pressure is considerably diminished, owing to the greater rarity of the air at this elevation : it ranges between twenty-four and twenty-five inches.

The relative amount of ozone in the air is much increased.

St. Moritz is certainly more favourably situated than most of the other villages of the Upper Engadine ; it is sheltered on the N. and N.W. by the Julier chain of mountains, and on the E. by a wooded elevation which projects as a spur from the mountains at the back, and so forms the eastern boundary of the St. Moritzer See. The declivity upon which it is built has also a southern aspect ; but the drawback to nearly the whole of the Engadine is the great height and nearness of the mountains bounding it to the S., so that they intercept a great deal of the sun's light and heat.

Of the salubrity, then, of the climate of St. Moritz in summer and in fine weather, there can, I imagine, be no difference of opinion. The air is perfectly pure, clear, dry, and bracing. There is an absence of that oppressive heat, even in the hottest weather, which makes the lower valleys almost unendurable ; for wherever there is shade in the Engadine there is also coolness. The freshness of the air, moreover, induces an increased capacity for muscular exertion, and the author of "The Regular Swiss Round" mentions that he has known some people come there "who have been so indisposed as to feel scarcely able to make the journey from London to Paris, and after a time have been able to make a twelve-hours' excursion on the glacier."

This statement goes more to the root of the matter than the writer of it probably thought at the time he penned it. I believe this kind of climate is especially useful to those who have been *strong* ; but by some accident or other, such as over-work, or illness, or trouble, have become weak : to those who possess a latent power of reaction. I do not think it is so advantageous to the essentially weak person, to those to whom "twelve hours on a glacier" always has been, is, and ever will be an utter impossibility.

For the same reason the Engadine does not suit persons advanced in years, unless they retain considerable bodily vigour. Show me an aged person whom the

Engadine suits well, and I know there are such, and I should be disposed to conclude at once that he possessed a naturally vigorous constitution.

But much of the benefit that is derived from a short residence in an elevated region like that of the upper valley of the Inn is due, I conceive, to the *alterative* influence which it exercises on the human organism. "Alterative" is a term we constantly have to use for want of a better one; we apply it to any agency which produces a change in, or "alters," by the way of improvement, the action of the bodily organs in a manner which we cannot otherwise explain. Now in passing from the sea level to an elevation of over 6000 feet, we must *alter* in a very essential manner the conditions of our lives. Our circulatory organs, our respiratory organs, our secretory organs, are working under altered conditions. This alterative action is, of course, assisted by the coincident change from possibly unwholesome to wholesome food, from weary hurtful work to refreshing rest, and from insufficient exercise to bodily activity.

It will be observed that I have said a *short residence*; by that I mean from three to eight weeks, and I think it undesirable, in many instances, to prolong a stay in the Engadine beyond this period. Most of the visitors to this Alpine valley do not wish to become acclimatised there. They have to return to the sea level, and live there for the rest of the year. We know from experience that it is not wise to continue an alterative course of treatment too long, or repeat it too frequently; for either it will lose its effect altogether, or, worse, it may do harm.

The Swiss physicians have, I presume, observed this, as they recommend that, after three weeks, if it be deemed advisable to prolong the "cure," that the patient should go down into Italy or into the Tyrol for a short time, and return and complete the course subsequently. I doubt not that this is sound advice, though it may be inconvenient to follow.

The experience of most of those who have passed

several seasons *consecutively* at St. Moritz, has been that after their first season they have left immensely benefited ; after their second season, considerably benefited, but less so than after their first ; after their third season, still benefited, but decreasingly so.

The conclusion to be drawn from all this is, that you may place yourselves under very altered conditions of life, with advantage, for a time, but it is better not to continue to do so too long, or repeat it too often.

It is wiser, therefore, to go to St. Moritz every other year than every year, or to go for two years and remain away for two years. And yet it is quite possible that there may be persons to be heard of who obtain benefit from a visit to St. Moritz *every* year ; for the human constitution most provokingly resists any attempt to make it universally conformable to general rules.

*OTHER RESORTS IN THE UPPER
ENGADINE.*

What is most characteristic about the Upper Engadine is its great extent as well as its great elevation. Nowhere else in Europe is there a valley of the same elevation, and of the same magnitude, and with the same number of permanently inhabited villages.

Here there are nearly thirty miles of broad valley and good level carriage road, traversed daily in various directions by postal diligences, at an average elevation equal to that of the Rigi Kulm; while some of its villages are situated at an elevation of over 6000 feet above the sea. The direction of the valley is from S.W., where it commences at the low pass of the Maloya, to N.E., where it terminates in the bridge Punt Auta; its natural boundary is, however, some three or four miles lower down.

Just beyond St. Moritz a ridge crosses the valley, leaving only a narrow gap through which the foaming waters of the Inn force their way, and forming a sort of natural division of the Upper Engadine into two nearly equal halves, which differ considerably in aspect and agricultural character. The upper half, viz. that between the Maloya and St. Moritz, is narrower, its mountain boundaries on each side are grander and wilder, and much loftier, and their summits are covered with extensive glaciers and snow-fields; while the floor of the valley is occupied by a series of small but beautiful lakes abounding in trout, and linked together by the stream of the Inn, which flows through them. In some parts the mountains, covered with dark-green

pine forests, rise gradually in gentle slopes from the shores of the lakes, in others they rear themselves as wild rocky barriers precipitously from the surface of the water. The lower half, that which extends from the ridge above alluded to to the termination of the Upper Engadine, has a very different appearance. Here there are no lakes, the floor of the valley is much wider, and is occupied by broad stretches of meadowland, through which the Inn quietly and tamely flows along. The mountains on each side are of lower elevation, they all rise in gentle slopes from the floor of the valley, and present no bold or striking features of form or outline.

In the upper half of the valley, viz. between the Maloya Pass and the Baths of St. Moritz, there are three well-known villages which are resorted to by visitors to this district in the summer months; these are Sils, Silva Plana, and Campfer. In the lower half of the valley, Celerina, Samaden, and Pontresina are the only villages which can be said to have any vogue as resorts for strangers. The village of Zuz has, however, recently been promoted into a *Luftkurort*, and must therefore be reckoned amongst the health resorts of the Upper Engadine.

There is no more characteristic and picturesque village in the Upper Engadine than Sils; or rather there are two villages of that name, one, in a raw windy situation on the north side of the valley, is called Sils Baselgia, and the larger and better-built village is termed Sils Maria—this is on the south side of the valley, in a protected situation, at the commencement of the ravine which leads into the beautiful Fex valley.

Sils Maria certainly commands some of the finest views in the Upper Engadine. The Silser See, close to which it is built, is the first and finest of the lakes encountered in this upper part of the valley, and, indeed, is the largest lake in the Alps at this elevation, being three miles in length and a mile in breadth at its broadest part. The mountains surrounding it, especially in the direction of the Maloya,

are remarkably picturesque and varied ; and some wooded promontories projecting into it from the southern shore close to Sils Maria add considerably to its beauty. The village of Sils Maria is 5880 feet above the sea, it is clean and well built, and possesses two very good hotels. It is especially well adapted to those who desire to lead a very quiet life, as it is far away from the more frequented spots, such as St. Moritz, Samaden, and Pontresina ; and as it is well protected from the prevailing winds, it serves as a good summer station for consumptive cases.

Numerous pleasing excursions into the adjacent Fex valley, and to many picturesque spots along the wooded hills which adorn the southern shore of the lake, are quite within the powers of invalids ; while the more robust can find abundance of severe work in the surrounding valleys and mountains. Few persons who spend a season in the Engadine fail to pay a visit to Sils Maria, or to explore, at any rate in part, the Fex valley, at the entrance of which it lies, a valley especially rich in specimens of the brilliant Alpine flora which characterises this region.

Silva Plana is a village of considerable size, with a large posting establishment, about three miles from Sils and five from St. Moritz. It is the next village you come to in descending the valley from Sils. It is very pleasantly situated at the foot of the Julier Pass, in the centre of the lake scenery of the upper part of the valley, having the Silva Plana lake on one side of it, and the Campfer lake on the other. It often has rather a bustling appearance, from the frequent arrival and departure of post carriages, the changing of horses, etc. etc., and this gives it somewhat of an air of unrest, as if everybody there was on the point of going somewhere else !

It is, however, a convenient stopping-place for tourists on their arrival in the Engadine either by the Julier Pass or by the Maloya from Italy ; and it serves as a convenient centre for visiting the attractive scenery around. It has a large and well-appointed hotel, and one or two humbler *pensions*.

There is also an English chaplain here during the season, and many families pass the whole summer very pleasantly and comfortably here, where they avoid the crowd of visitors at St. Moritz and at Pontresina, and get perhaps better accommodation at a little less cost. Silva Plana is most conveniently situated for making many of the popular mountain excursions in this district, and an office for guides has been established there, where an experienced guide can always be obtained. Nearly opposite the village a deep depression may be noticed in the mountain-chain forming the southern boundary of this valley. This is the "Fuorcla da Surlej," or Surlei Forcla. This is a moderately high pass (9042 feet) into the Roseg valley and to Pontresina. It is an interesting and easy walk of about seven hours, and is an excursion frequently made between Pontresina and Silva Plana or *vice versâ*.

To the right of this pass, and also nearly opposite the village, is the great mountain-peak of the Piz Corvatsch, the rounded summit of which is covered with vast fields of snow and glacier. This is an easy mountain to climb, and is often ascended from Silva Plana in about four hours and a half; good mountain-climbers take less. There is also a path up the Piz Julier from this village. Besides these and other mountain excursions, there are many easy and interesting walks in the neighbourhood of Silva Plana. One of the longest and most attractive of these is across the bridge to the little village of Surlej, and then along the right shore of the Silva Plana lake to Sils Maria, by a recently-made footpath. By means of this path it is now possible to walk the whole of the way from Sils Maria to the Baths of St. Moritz through shady pine-woods, instead of along the dusty high-road on the northern side of the valley. The village of Silva Plana is 5900 feet above the sea.

The next village we come to is *Campfer*. This admirably situated village is two miles from Silva Plana, and only one mile from the Baths of St.

Moritz. Its immediate surroundings are exceedingly picturesque, and it possesses most excellent hotel accommodation—the “Julier Hof,” kept by M. Muller, having long and deservedly enjoyed the reputation of being one of the most comfortable and best-conducted hotels in the valley. It is a convenient abode for those visitors to the Baths of St. Moritz who would be at St. Moritz but not of St. Moritz ; it is as near the Kurhaus and the baths as the village of St. Moritz itself. The walk through the woods on the right bank of the river, between Campfer and the Kurhaus, is infinitely preferable for pedestrians to the hot, steep, and dusty road which leads from the latter to the village of St. Moritz ; while both the upper road, which connects Campfer and St. Moritz, and the lower road, along the left bank of the river, command charming views of lake, river, and mountain scenery. The wooded and grassy mountain slopes around the village afford facilities for quiet rambles which are not to be found in the more frequented parts of the valley, while for exploring the attractive lake region of the upper part of the valley, it is far more conveniently situated than St. Moritz, Samaden, or Pontresina.

If it were not for the gregarious instincts of average humanity, Campfer would be as popular as St. Moritz ; it is perhaps fortunate for those who appreciate its attractions that it is not so. Campfer has an elevation of 5950 feet above the sea, and by the position of the surrounding mountain-ridges it enjoys considerable protection from the prevailing winds, its warm and sunny situation, and the many easily accessible walks around rendering it a very suitable summer station for invalids.

It is an easy and beautiful walk up to the restaurant and summer-house called *Crest-alta*, which is finely situated on the top of a wooded promontory, which projects in the most picturesque manner from the south side of the valley into the Campfer lake. Another easy walk in the opposite direction is to the summer restaurant known as the “Alpina,” situated

among the green Alps, which cover the mountain slopes lying above the upper road which connects Campfer with the village of St. Moritz. The view of the chains of lakes of the Upper Engadine, with their wild mountain barriers as viewed from the Alpina, is one of the finest things to be seen in the valley.

Passing now to the lower half of the Upper Engadine beyond St. Moritz, the first village we arrive at is Cresta, and a few minutes farther on we reach the village of Celerina, to which parish the adjacent village of Cresta belongs. Celerina is situated about midway between St. Moritz and Samaden; but between St. Moritz and Celerina we have to descend in steep zigzags the high ridge which here stretches across the valley and forms a natural protection to St. Moritz from the north-east. Beyond Celerina the valley continues at an almost unbroken level to its termination. These two villages, Cresta and Celerina, are particularly neat, with their lime-washed walls, green shutters, handsome old doorways, and windows filled with flowers, amongst which, some especially fine carnations are the envy and admiration of most visitors. There are some comfortable *pensions* in both villages, where quiet and modest accommodation can be obtained at a cheaper rate than either at St. Moritz or Samaden. Celerina is 5600 feet above the sea, rather more than 400 feet lower than St. Moritz Kulm, which is 6032.

Samaden, rather more than eight miles from St. Moritz, has obtained a vogue, and is popular in spite of its extremely uninteresting situation. It is situated just at the spot where the Upper Engadine begins to be almost ugly. But a good hotel, and an obliging and clever landlord, have no doubt contributed much towards creating and maintaining its popularity. Then it has a certain prestige as the capital of the valley, and as the largest and most central village in it. It has long served also as a kind of reservoir for the reception of the stream of visitors waiting for accommodation at Pontresina and St. Moritz, being

about equi-distant from both ; and it has no doubt happened that many of these, finding themselves in good quarters at Samaden, have preferred to stay there, and so Samaden has become a considerable resort of the summer visitors to the Engadine. The road from the Val Tellina, which crosses the Bernina Pass, here joins the main-road of the Engadine. Indeed numerous post-roads converge at Samaden—two from the north, over the Albula and the Julier Passes respectively, one from the S.W. coming up from the plains of Lombardy and the Italian lakes over the Maloya. Another also from Italy, as we have already said, from the S.E. over the Bernina, and one from the E., connecting the Lower Engadine and the Tyrol with these other roads. Recently a Kurhaus has been established at Samaden, which is especially intended for the reception of winter visitors, and it is fitted up with bath and douche rooms, with properly heated apartments, corridors, and verandahs to adapt it to the purposes of a winter sanatorium for consumptive patients. For many years past one of the hotels at Samaden has been kept open for the same purpose through the winter, and a few invalids have generally remained there each year through the winter season.

There is one fine view from Samaden, and that is the view of the snow-clad summits of the Bernina group, which is well seen from the terrace of the *salle-à-manger* of the Bernina Hotel.

There are many pleasant and invigorating walks along the meadows which cover the lower slopes of the mountains, on the north side of the valley, between Samaden and Celerina ; and on a warm summer day, when the high-road is exceedingly hot, dusty, and fatiguing, the air on these grassy slopes, where there are good paths, 300 or 400 feet above the level of the valley, has seemed to me often very refreshing and grateful. The mountain-paths along these alps, between Celerina and Samaden, I have thought one of the pleasantest walks in the Upper Engadine ; the bracing character of the air there being

particularly noticeable. There are also pleasant walks through the pine-woods, on the same side of the valley but in the other direction, viz. towards *Bever*s. A pretty little English church has been built on a terrace behind the post-station, in a conspicuous and agreeable position.

But the most popular and interesting excursion from Samaden is that to the *Bever*s valley, at the entrance to which the village of *Bever*s is situated. This valley is one of the most picturesque and beautiful of the whole of this region, the deep green of its verdure, richly variegated with the choicest Alpine flowers, which are here found in great abundance, the stillness and repose of its shady retreats, its bubbling streams, as well as the stern grandeur of the mountain precipices that close it in at its deepest part, impart to it a charm of variety perhaps nowhere else to be found in this region. The Hon. Lionel Tollemache remarks of this valley, in an interesting essay on the Upper Engadine, which he published some years ago in the "Fortnightly Review:" "No part of the Engadine impresses me nearly so much as the beautiful valley called *Beversthal*. In it the number of creeping firs is said to be almost unexampled, that of *Pinus cembra* is certainly very great. These with their dark foliage heighten the effect produced by this narrow valley, which is enclosed between high walls of steep and rugged mountains. It runs in a crescent round the back of Piz Ot, and altogether its aspect has a peculiar charm, a charm which a German writer declares to be unparalleled. Nor is it less to the ear than to the eye that this dim religious valley is impressive. . . . it is a sort of mountain *cul-de-sac*, wholly without traffic, and which the absolute stillness helps to make solemn and even death-like." Samaden is nearly 5700 feet above the sea. About three miles from Samaden, along the road which turns to the S.W. and goes to the Bernina, lies the most popular of Engadine villages, *Pontresina*. Its situation is exceedingly picturesque, and it possesses several excellent hotels.

It is, moreover, the most convenient station for exploring the high mountains, the villages, and the glaciers of this portion of the Upper Engadine. It is close to the foot of Piz Languard, the Rigi of the Engadine, and it is about an hour nearer the glaciers of the Morteratsch and the Roseg than either St. Moritz or Samaden. It is out of the way of the patients and the doctors of St. Moritz, but it is in the way of the raw, blistered, be-spectacled faces, and be-roped bodies of Alpine club-men of all nations. It has been said to have a milder climate than St. Moritz. From its situation, in a wide open space, at the junction of two lateral valleys with the main one, it is much exposed to the direct rays of the sun for many hours during the day; and around and near the village I have at times found the sun-heat greater and more unbearable than in almost any other locality I am acquainted with. But for the same reasons it is to be expected that the nocturnal cold would be greater than at St. Moritz, and it is so situated as to receive directly the cold gusts of air blowing down the Roseg valley. I have certainly experienced colder winds at Pontresina than at St. Moritz.

To those who are vigorous enough to devote themselves daily to mountain and glacier excursions, Pontresina is undoubtedly the best resort in the Upper Engadine, but I do not think it is so well adapted for the quieter life of an invalid as either Campfer, Samaden, or St. Moritz. It is certainly a convenience, to those who need the extremely bracing and tonic influence of glacier air, to be tolerably near, as one is at Pontresina, so large and accessible a glacier as that of the Morteratsch. The elevation of this village is nearly as great as that of the highest part of St. Moritz, being about 5950 feet above the sea. Excursions of every variety of distance and difficulty can be taken from Pontresina, and level walks and rambles of much interest abound. The walk through the woods from Pontresina to the Meierei, a sort of farmhouse restaurant, close to the lake of St. Moritz, is

one of the most popular and interesting, passing on the road the beautiful little Statzer See. Another mile by a path along the southern shore of the St. Moritz lake brings one to the baths and Kurhaus.

Most visitors to Pontresina make at least one excursion to the Hospice on the summit of the Bernina Pass, a drive of about two hours; and this Hospice has been occasionally resorted to as an *air cure* by those who have felt that they needed an extraordinary and exceptional amount of bracing! It is more than 1500 feet higher than St. Moritz Kulm, and the air is there wonderfully keen and cold, especially after sunset. The only night I ever spent there—a clear moonlight night at the end of August—the cold was very great, and when one got into one's bed it felt iced; it seemed to me that without the aid of a hot-water bottle, which I placed between my shoulders to thaw the pillow and upper part of the bed, one would have been chilled into restlessness for the whole night. The bracing climate of the Bernina Hospice has, however, proved very grateful to many. The Hon. Lionel Tollemache, in the article I have already quoted, speaks of “a delicate lady” who found it worth her while to go almost daily from Pontresina to the top of this pass, a distance of twelve miles, so as to breathe the fine air for a few hours. I was certainly surprised to find a gentleman suffering with heart-disease, a disease in which a residence in high regions is considered to be specially counter-indicated, apparently gaining benefit there. To quote Mr. Tollemache again, who is really an authority on the subject of the Bernina Hospice, as he must have spent altogether many months there, he says: “A few have found their stay at Bernina the turning-point after a long illness; and how enthusiastically do they now dwell on its abnormal combination of charms! In fact, they go to the Bernina to have the summer of their discontent made glorious winter; transformed indeed into a sort of expurgated edition of the English winter—the English winter without its damp, and the east winds without their pungency:

differing also from the English winter in the deep-blue sky, and in the dazzling and enchanting brilliance of the sunlight. One drawback, however, there is to a long residence on this pass—there are absolutely no trees; unless, haply, we count as a tree the dwarf willow (*Salix herbacea*), which rises barely two inches from the ground! . . . Perhaps, after all, the absence of trees is not an unmixed evil. The superiority of Bernina to Pontresina in point of bracingness is out of all proportion to the difference between the places in respect of cold. That superiority is, in great part, due to the extreme dryness of the Bernina air; and the dryness must be increased by the scantiness of vegetation. . . . Many wild-flowers grow there, including some not found at the lower elevation of St. Moritz." For quite exceptional cases and exceptional constitutions, the extremely vigorous bracing climate of the Bernina may, for a time, be suitable; but I am satisfied it is of extremely limited applicability as a health resort, even to those exceptional cases.

The only other village in the Upper Engadine that can be spoken of as a health resort is the village of Zuz, about eight miles below Samaden. An attempt has recently been made to establish it as a winter as well as a summer station, and a large hotel has been adapted for this purpose, with what success I have not heard. It has about the same elevation as Samaden, 5680 feet, and is raised somewhat above the floor of the valley at this part. The scenery around is pleasing, and there are several excursions to be made into the adjacent villages and upon the neighbouring mountains; but the scenery is altogether inferior to that of the upper part of the valley, and is not likely to prove attractive to English visitors.

THE LOWER ENGADINE—THE BATHS
OF TARASP.

The least interesting part of the Upper Engadine is certainly that which lies between Samaden and the commencement of the lower valley of the Inn. The road is almost a dead level, there are no lakes to add to its picturesqueness, as there are above St. Moritz, while the mountains which rise on each side have a bare appearance, and present no very striking characters either of form or magnitude. On the whole, it must be admitted that this part of the Inn valley is somewhat monotonous, although we are assured that those who have time to visit and explore the side valleys will find the region full of interest.

The Lower Engadine is very beautiful, more pastoral, more picturesque, more varied, than the upper valley. It is about a five hours' drive through for the most part charming scenery, from Samaden to the Baths of Tarasp, the chief attraction in the Lower Engadine for the investigator of health resorts. The Kurhaus consists of a large mass of buildings, almost buried in a narrow gorge between the bases of the mountains on each side of the valley. It can receive over two hundred guests, and affords excellent accommodation. It is built close to the principal springs, and the baths are within the building itself.

A small *dépendence*, called the Villa Kurhaus Tarasp, was built in 1876 at the west end of the Kurhaus garden, and is intended for the reception of families and others who may desire a quieter place of abode than the Kurhaus itself. A fine Trinkhalle,

with covered promenade and rows of shops, was built in 1875-76 on the right bank of the river, close to the principal spring. Here the Kurhaus orchestra plays in the early morning, while the visitors alternately drink and promenade.

The information I have to give with respect to this health resort will naturally arrange itself under the three following heads: 1, the nature, composition, and therapeutic effects of its mineral springs; 2, the nature of its climate; 3, some topographical and general details.

There are many mineral springs which rise very near each other in the neighbourhood of Tarasp—some alkaline and aperient, some chalybeate, and others, in the Val Plafna, behind Tarasp, sulphureous. The springs to which Tarasp chiefly owes its repute are the saline-alkaline sources which rise close to the banks of the Inn, and in the immediate vicinity of the Kurhaus. Those that are used for drinking are situated on the right bank of the river; there are others on the left bank which are used for bathing purposes.

The drinking springs are named the St. Lucius and the St. Emerita; they rise quite close together, and are almost identical in composition. The St. Lucius is somewhat richer in carbonic-acid. The following is the latest analysis of these two springs:

ANALYSIS BY PROFESSOR HUSEMANN, 1872.

In 16 ounces = 7680 grains, the carbonates calculated as bicarbonates.	St. Lucius Spring.	St. Emerita Spring.
Sulphate of potash	2'916	3'090
„ soda	16'131	15'912
Borate of soda	1'322	1'354
Nitrate „	'006	'006
Chloride of sodium	28'216	28'308
„ lithium	'022	'020
Bromide of sodium	'163	'165
Iodide „	'007	'007
Bicarbonate of soda	37'426	37'545

In 16 ounces = 7680 grains, the carbonates calculated as bicarbonates.		St. Lucius Spring.	St. Emerita Spring.
Bicarbonate of ammonium		507	504
„ lime		18800	18772
„ strontia		005	005
„ magnesia		7524	7563
„ protoxide of iron		165	163
„ „ manganese		002	002
Silica		069	070
Phosphoric-acid		003	003
Alumina		002	002
Barium, Rubidium, Cæsium, Thal- lium, organic matter	traces		traces
Total amount of fixed matters	113'492		113'289
Free and half-free carbonic acid gas, cubic inches	76'17		75'42
Quite free ditto	33'92		33'08

The carbonates are all contained in the water, combined with some carbonic-acid, in the form of bicarbonates; and in each pint of the water there are nearly thirty-four cubic inches of free carbonic-acid. It will be seen that these springs contain a large amount of bicarbonate of soda—thirty-seven grains in a pint; also a considerable quantity of chloride of sodium (common salt), and a moderate amount of the aperient sulphates of soda and potash. Next in importance figure the alkaline earthy carbonates of lime and magnesia, and there is a small quantity of iron.

It is interesting and instructive to compare the composition of these springs with that of other well-known European spas which possess some properties in common with them; such, for instance, as the Grande Grille at Vichy (a simple soda spring), the Rakoczy at Kissingen (a common salt spring), and the Sprudel at Carlsbad and the Ferdinands Quelle at Marienbad (both characterised by the amount of aperient sulphates they contain).

Such a comparison is made in the following table:

In a pint, i.e. 16 oz. = 7680 gr. the carbonates calculated as mono- carbonates.	Tarasp Lucius Quelle.	Carlsbad Sprudel.	Marienbad Ferdinands Quelle.	Kissingen Rakoczy.	Vichy Grande Grille.
Total solid matters.	93.8	42.4	70.6	85.6	40.8
Carbonate of soda	26.4	10.0	11.2	—	27.0
Sulphates of soda, mag- nesia, and potash	19.0	19.9	36.6	4.5	2.3
Chloride of sodium	28.2	8.0	13.1	44.7	4.1
Carbonic-acid gas, free and half-free—cubic in.	76.2	12.6	68.8	41.8	—
Carbonic-acid gas, quite free, ditto	33.9	3.9	—	27.3	13.1
Temperature in Fahren- heit degrees	44	164.5	50.5	51.2	102.5
Elevation in feet, about	4000	1200	1900	600	800

It will be seen that the Tarasp springs contain nearly as much carbonate of soda as the Grande Grille at Vichy ; as much of the aperient sulphates as the Sprudel of Carlsbad, and about half as much as the Ferdinands Quelle at Marienbad ; while it contains about two-thirds the quantity of common salt contained in the Rakoczy of Kissingen. It is richer in free and half-free carbonic-acid than any of them. The high temperature of the Carlsbad and Vichy springs is, no doubt, a great advantage in some cases. But for tonic and bracing purposes the considerable altitude of Tarasp is an important condition.

We find, then, that the Tarasp water combines the alkaline character of the Vichy and the aperient character of the Carlsbad springs, while the presence of so large an amount of carbonic-acid renders it more agreeable as a beverage, and promotes the absorption of its constituent salts. In common with the Kissingen and Marienbad springs, the presence of an appreciable quantity of iron renders it also a blood restorative,

while the quantity of chloride of sodium in it makes it a valuable stimulant to the organs of digestion.

There is scarcely a spring in Europe that is known to possess so many important qualities.

But Tarasp has the additional advantage of possessing several acidulous chalybeate springs of a tonic character. The one most commonly drunk is the St. Bonifacius spring. It is situated on the right bank of the Inn, about two miles distant from the Kurhaus. Recent analysis, however, of this spring shows that it does not contain nearly so large a quantity of iron as was formerly supposed; and, what is also of great importance, that both the absolute and relative proportions of its constituents vary with variations in the rainfall, so that the spring is clearly not protected from the influence of surface drainage. This spring has a pleasant and but slightly chalybeate taste, and contains a large amount of carbonic-acid.

It has the drawback of containing a large amount of the constipating carbonate of lime.

There are several other iron springs in the district of Tarasp, but the only other to which I shall now call attention is the Wyh spring, which rises out of the ground, and when first I visited this region in 1869 was quite unprotected and unenclosed, in one of the meadows on the hillside above the village of Schuls, and about twenty minutes' walk from the Kurhaus. This spring contains a considerable quantity of iron, and a very large amount of free carbonic-acid, which makes it one of the pleasantest mineral waters to drink I have ever tasted. At that time it was not much frequented. We found a tumbler hidden under an adjacent bush, which had been left there by a benevolent fellow-countryman for the use of those who might subsequently find their way to this delightful spring. We made use of it and returned it to its hiding-place. This spring in 1877 was provided with a new basin, and an "elegant little wooden pavilion" erected over it. It is most picturesquely situated, and commands fine views in all

directions. The waters of this spring, which flow in great abundance, are now carried off to the new bathing hall at Schuls, where they become of some importance as baths on account of the quantity of carbonic-acid in them. Another spring near Schuls and more accessible than the Wyh Quelle, is the Sotsass Quelle; this spring contains very little iron and is chiefly valued as an agreeable drinking water, on account of its richness in carbonic-acid gas. The analysis of these three springs is given in the following table :

In 16 oz. = 7680 gr., carbonates as mono-carbonates.	Bonifacius.	Wyh.	Sotsass.
Sulphate of potash	·589	·084	·038
„ soda... ..	1·840	·087	·153
Chloride of sodium	·300	·016	·077
Carbonate of soda	6·184	·028	—
„ lime	15·286	9·467	7·970
„ magnesia	2·589	·648	·600
„ protoxide of iron... ..	·141	·204	·098
Total of solid matters... ..	27·866	10·696	9·173
Free and half-free carbonic-acid in cubic inches	57·26	48·42	47·93
Quite free carbonic-acid in cubic inches	32·82	38·37	39·49

I have now a few words to say as to the therapeutic action of these waters.

It will not be difficult, bearing in mind the composition of these mineral springs, to analyse briefly their action on the human economy.

The primary effect of these alkaline-saline springs must be an antacid action on the gastric mucous membrane. After absorption of the saline constituents, we naturally get increased activity of the secreting organs, by which these salts are eliminated from the blood, as well as increased activity in the gastro-intestinal glands by which the digestive fluids

are secreted, and in this way they act as stimulants to digestion. If the waters be taken early in the morning, as is generally ordered, with gentle walking exercise, their laxative effects are commonly obtained before breakfast or immediately afterwards. The diuretic action of the water is manifested later in the day. It is further reasonable to conclude that when a considerable quantity of an alkaline-saline fluid is taken into an empty stomach, from which it must at once pass into the portal system of veins, and thence through the secreting structure of the liver, that the condition of this organ and the character of its secretion may be greatly modified thereby. We know that sodium is the base with which the acids of the bile are found combined, and there can, I think, be but little doubt that the internal administration of dilute solutions of the carbonate of sodium exert an important influence in modifying the character of this secretion.

One of the most useful remedies in cases of jaundice associated with congestion of the liver, as well as in cases of obstruction from biliary calculi, or from the presence of inspissated bile in the duct of the gall-bladder, is large draughts of warm water containing carbonate of sodium in solution. What is the Carlsbad water, which is found to be so efficacious in the relief of biliary concretions and in the reduction of fatty and congested livers, but a warm dilute solution of carbonate of sodium with some additional saline purgative constituents? Doubtless the warmth of the water, in this instance, favours its action. The Tarasp water is much richer in the alkaline carbonate of soda, and very nearly as rich in aperient salts. We are therefore quite prepared to hear that these waters are found especially useful in visceral congestions and obstructions, as, for example, chronic affections of the liver, hyperæmia of that organ, and the fatty liver arising from errors in diet, certain cases of jaundice, and gall-stones; congestion of the spleen after intermittent fevers;

dyspepsias, especially those associated with acid fermentation and with vomiting, and originating in want of exercise, improper or irregular feeding, or obstinate constipation; general corpulence; chronic gout and rheumatism—conditions especially associated with increased development of offending substances in the blood or with defective action of the eliminatory organs. Tapeworms are said to be occasionally expelled during the use of these springs. Some forms of catarrhal affection of the kidneys and bladder, and disposition to the formation of renal calculi, are also relieved here, just as, indeed, they are by the use of the Vichy water. Disorders of menstruation, associated with a chronically congested state of the uterus and ovaries, are reputed to be relieved in a very remarkable manner by a course of the waters at Tarasp. Some cases of chronic eczema have also been greatly benefited here. It is further stated that persons suffering from chronic laryngeal or bronchial catarrh with hoarseness are relieved by drinking these waters, and some physicians believe them to be useful in the incipient stage of pulmonary tuberculosis. It is, however, very probable that the pure and invigorating mountain air has more influence in producing the improvement observed in cases of pulmonary disease than the use of the mineral springs.

As to the quantity of water that is usually taken, patients begin with two or three glasses (each holding six ounces), and increase gradually to six or eight. These are drunk in the morning before eating, at intervals of a quarter of an hour, gentle walking exercise being taken all the time. It not unfrequently happens that persons with weak digestions suffer considerable inconvenience from headache and flatulence if they drink any quantity of cold water before breakfast. When such is the case it is better to take an early light breakfast, and drink two or three glasses of the water two or three hours afterwards. If necessary, a glass or two more may be taken late in

the evening. A common practice also is to warm the water before drinking.

It is very obvious that a powerfully alterative aperient and alkaline water should not be taken continuously for a long time. There are very few cases in which its use should be prolonged without interruption for longer than a fortnight; and many cases would probably derive much greater benefit from a combination of the saline and the chalybeate treatment than from either singly—the saline water for three or four days, then the chalybeate for a similar period, and so on. I am thinking especially of those cases of anæmia in females, associated with obstinate constipation and disorder of the generative system, in which we know, as a matter of common observation, that preparations of iron are rarely useful unless combined with an aperient, and that frequent aperients are injurious unless combined with some tonic remedies. Tarasp, with its saline aperient water on the one hand, and its bracing chalybeate spring on the other, seems to be exactly suited to such forms of disease.

In the next place I would desire to say a few words on the climate of Tarasp. This district, situated at an elevation of between 4000 and 4500 feet above the level of the sea, possesses all the invigorating characteristics of an Alpine climate, while it has the advantage of being much less severe and rigorous than that of the Upper Engadine. There are here fewer sudden changes of temperature, and an unexpected fall of snow in the summer months, by no means an uncommon occurrence at St. Moritz, is at Tarasp quite an exceptional event. The milder character of the climate is indicated by the much greater luxuriance of vegetation; rye and flax are extensively cultivated in this district, and fruit-orchards flourish near Schuls, while the local flora is exceeding rich and diversified.

As well as being milder, the air is not so dry and rarefied as in the Upper Engadine—a condition which

occasioned frequently most uncomfortable excitement and irritation in many cases of functional nervous disorders which used to be sent in considerable numbers to these high Alpine stations. Unpleasant and troublesome herpetic eruptions about the face are very commonly produced in persons with delicate skins by the dry stimulating air of St. Moritz. These are not so frequently observed in the milder climate of the Lower Engadine. This part of the valley is almost entirely protected from the north and north-east winds, the prevailing winds being the south-east and north-west.

The snow, which accumulates to some thickness on the ground during winter, begins to melt here in April. The spring is short, as in all mountain districts, and in June the summer is so far advanced that on the 15th the bath season commences. This continues to the end of September, a month generally remarkable for constantly fine genial weather, the only drawback being the shortness of the days. The mean atmospheric temperature in the months of July and August ranges from 56 degrees Fahrenheit to 60 degrees Fahrenheit. The maximum and minimum temperatures noted in the same months were 82 degrees Fahrenheit and 37·5 degrees Fahrenheit. It will thus be seen that the climate of Tarasp especially commends itself to those cases in which it is thought desirable to try the influence of mountain air, without incurring the risk which certainly attaches itself to an exposure to the sudden changes of temperature, the highly rarefied air, and often the continuous cold of the Upper Engadine.

Also, on leaving the Upper Engadine, Tarasp offers an admirable intermediate point where patients may break the suddenness of their descent into the plains of Italy and Switzerland, which to many people proves very trying, and the presence of chalybeate springs of a somewhat similar character to those of St. Moritz offers facilities for continuing or prolonging the

course of steel waters if it be thought desirable to do so.

This account of Tarasp would be very incomplete if I were to omit to add to the preceding remarks on its climate and mineral springs a few topographical and general details.

The quickest way of getting to the Lower Engadine from England is through Bâle to the Landquart station on the railway between Zurich and Coire—it is the next station but one after Ragatz. A little distance from this place, the beautiful and picturesque valley of the Prättigau opens. The road ascends through this valley to Davos, in the Davosthal, which is reached in about six hours by diligence or by posting. From Davos a carriage road crosses the Fluela pass to Sûs in the Lower Engadine, and by this route Tarasp may be reached in about seven hours from Davos, so that the whole journey between Landquart and Tarasp may be accomplished in one rather long day, and the entire distance between London and that place in three days, sleeping one night on the road at Ragatz or Landquart. But this would be too fatiguing for most persons. A better plan is to rest five or six hours at Bâle, and go on in the afternoon to Ragatz or Coire (there is no good hotel at Landquart), and the next day go from Coire or Landquart to Davos. There is a post route between each of those places and Davos. Sleep a night at Davos, and proceed the next day to Tarasp.

I have heard it remarked that "Tarasp is in a hole," and an impression of this kind is certainly produced upon one when, coming from the Upper Engadine, the diligence drives down to the left bank of the river and deposits one at the Kurhaus, which is built at the bottom of the somewhat narrow gorge through which the Inn here flows. But although it has pleased the proprietors to build the *Établissements des Bains* at the bottom of this gorge in order to be close to the principal mineral springs, it does not follow, nor is it

true, that "Tarasp is in a hole." Tarasp is the name of the district, and a spot more beautifully situated or with greater natural advantages it would be difficult to find. It forms a small plateau, around which spreads a hilly country covered with meadows, cornfields, and wooded slopes in charming variety, crowned on each side by mountain summits of singularly bold and striking outline. Beautiful lateral valleys, the sides of which are covered with shady and fragrant pine-woods, penetrate deeply into the recesses of the Alpine chain, and afford a great variety of singularly attractive walks. For mountain climbers there is every kind of work, from rugged hitherto unscaled peaks to those lower points of view which may be described, in guide-book phraseology, as "easily accessible for ladies;" while the largest glacier-fields in this part of the Alps—the Vadret-Lischanna—can be readily reached in a few hours. One of the great charms of the place is the number of pleasant shady walks over the wooded park-like hilly slopes in the immediate vicinity of the springs, which can easily be prolonged into more ambitious efforts as the strength of the invalid returns.

Those who object to the situation of the Kurhaus can obtain excellent accommodation at the village of *Schuls*, which is admirably placed, and distant about a mile from the springs. *Schuls* possesses several hotels: the best known are the old and new Belvidere. It has also recently become possessed of a bath-house, where baths can be taken just the same as in the Kurhaus at Tarasp. But commend me especially to the hamlet of *Vulpera*, where most assuredly the Kurhaus ought to have been erected; it is placed in a sunny and pleasant open spot about 300 feet above the bath establishment, on the opposite bank of the Inn, and from it a good zigzagged path leads in about seven minutes to the mineral springs. *Vulpera*, when first I knew it, contained but two or three homely *pensions*, now it has a Bellevue Hotel, kept by Fanconi, and several good *pensions*.

The village of Schuls, a most interesting spot, lies at the base of the slate mountains on the left side of the valley. It consist of two pretty little villages named Ober and Unter Schuls. They are surrounded by well-cultivated orchards, for in this comparatively mild climate fruit-trees flourish greatly. High above on the mountain-side are green Alps, broken by stretches of pine-woods, while down by the banks of the Inn lie fresh meadows. Schuls is protected by its position from cold winds, and the snow soon melts on its sunny heaths. The houses and buildings in the village are good, the old church stands most picturesquely on a high rock, and in olden times it offered a place of refuge and was often bravely defended. A fierce encounter took place on this spot in 1621 between the inhabitants and the invading Austrians. Men and women equally fought with the energy of despair; their courage however was unavailing against the overwhelming numbers of their assailants, although they repeatedly drove back the besiegers. At length the brave little band gave way, but not until the ground was covered with their own bodies and those of their enemies. Close below the church a bridge leads over the Inn to Vulpera and Tarasp, and then there is a second one over the Scarlbach, which here rushes forth out of a deep ravine.

The mountains on the right bank of the river present a very different formation from those on the left. Those above Tarasp are joined together by high *grats*, and from them short yet high ridges stretch towards the Inn. Nearly every one of these is surmounted by two massive pinnacles terminated by steep jagged points, presenting altogether a great variety of graceful and striking forms.

In front of this principal chain, a second runs from Tarasp towards Finstermunz, not inferior to the first in height. It begins with the Piz Pisog (10,427 feet) and ends near Martinsbrück in the Piz Lat. The two principal points of this chain projecting towards the

Inn, are the Piz St. Jean and the Piz Lischanna. Behind the latter, and enclosed by fearfully wild rocky precipices, lies the Vadret-Lischanna, the single great glacier of this side of the valley, being nearly six miles long and more than a mile and a half wide. There are many other small glaciers amongst these mountains, but no great ones, on account of the steepness of the mountains' sides and the narrowness of their ridges. From their summits deep ravine-like valleys stretch downwards towards the Inn. The principal of these are the Val Lischanna, Val Triazza, Val Uina, and Val Assa. The Scarl valley, with its lateral branches, insinuates itself deeply between the two adjacent ranges of chalk mountains.

There is scarcely any portion of the whole Alpine chain which presents a wilder or more broken outline than the mountains on the southern side of this valley; while it is rare to see such gigantic mountain forms so close to one another, and at the same time separated by such deep valleys. On this account it is that their outlines appear so sharply cut. The Piz Pisog rises directly to the south of Tarasp, in bare gray dolomite walls, whose perpendicular and inaccessible sides lead to a slender-pointed snow-covered summit. This mountain is one of the most imposing of Alpine forms; seen from Tarasp it appears as a pyramid, while behind it lengthens out into a long ridge studded over with many small low points, till it reaches the upper part of the rocky valley, Zuort, which is almost entirely occupied by glacier. The district of Tarasp spreads out at the foot of this grand mountain, and is surrounded on all sides by a hilly country covered with green meadows and patches of woodland in charming variety. Scattered here and there are hamlets and single houses, which constitute the parish of Tarasp; westward lies the hamlet of Fontana, commonly described as the *village* of Tarasp, and above this, on a high rock, the old Castle of Tarasp. The white walls of this fine old ruin are seen from far and wide, and form an

ornament to the whole valley. It is a conspicuous object even from the height of the Fluela Pass. The building is still in good condition. The view from it is an exceedingly grand and varied one, extending over the whole of the Unter Engadine valley. It once served as the seat of the Austrian governor of this district, and the Austrian eagle may still be seen on its outer walls. The principal church of the valley, in connection with a Capuchin convent, is situated at Fontana, on the bank of a beautiful clear lake of some extent, which affords good fishing. The whole of this region is remarkably beautiful. A new hotel and *pension* has been erected here, close to the little lake.

Tarasp was until 1815 an Austrian possession, and with its rocky fortress, proved very troublesome to the rest of the canton, particularly in time of war. The inhabitants, about three hundred souls, are Roman Catholics, and speak, for the most part, German. Above the lake there is a second plateau, separated from the lower one by a steep terrace, and on this plateau there is a second small lake, the Schwarze See. On the other side a stream called the Chlemgia flows through a fearfully deep gorge, its white foaming water eddying swiftly over black serpentine rocks.

The hamlet of Vulpera, which I have already alluded to as a charming spot for the residence of the visitors to the baths, is about half-an-hour's walk from the castle. It is about midway between the Château of Tarasp and the village of Schuls. It is built on a little plain above the Inn on its right bank. The river here flows over a deep rocky bed, close by the side of which the Kurhaus has been erected.

One of the most remarkable natural phenomena in the neighbourhood of Tarasp are the so-called Moffete. These are orifices in the ground, in the meadows on the way between Schuls and Fetta. Carbonic-acid gas streams out of these holes in sufficient abundance to suffocate any small animals that come near them. All vegetation is also destroyed

for some distance round. We observed numerous dead insects, small birds, mice, and even a snake, scattered around these curious apertures in the soil.

Tarasp is a most convenient centre for interesting excursions ; situated as it is within a few hours of the grand defile of the Finstermunz and the Austrian frontier, within a day's walk of the finest pass in the Alps—the Stelvio, and bounded directly to the north by the peaks and glaciers of the Silvretta group.

CHAPTER III.

DAVOS PLATZ.

A STUDY OF HIGH ALTITUDES FOR CONSUMPTIVE PATIENTS.

WHEN I first visited the Engadine and the Davos valley in the autumn vacation of 1869, the question of the cure of consumption by a prolonged residence in these high mountain valleys was just beginning to engage the attention of English physicians.

The wider general question whether consumptive patients generally should or should not be sent to elevated situations had already been the subject of much discussion, and the evidence in favour of an affirmative answer to the question appeared to be unusually strong. But the evidence which has been collected on this point tends to prove that immunity from consumption does not follow any particular level of elevation, as had at one time been suggested, and it would seem that the *mere amount* of elevation must be eliminated from the discussion. It is admitted that the altitude of immunity from phthisis varies in different latitudes, descending in proportion as we pass from the equator to the poles. In the tropics it is necessary to ascend to an elevation of between 8500 and 9000 feet. In the Peruvian Andes, for instance, patients are sent to mountain valleys reaching an altitude of nearly 10,000 feet. In Mexico they ascend to valleys 6500 and 7000 feet above the sea-level. On the other hand, in the Pyrenees, we are assured that

at elevations varying from 1760 feet (Bagnères de Bigorre) to 4580 feet (Gavarnie), phthisis is equally rare.

In Switzerland some localities not more than 3000 feet above the sea appear as free from phthisis as others of twice that elevation. In the Black Forest and in the Harz mountains of Germany, it is stated that consumption is extremely rare at the comparatively moderate height of 1400 to 2500 feet; while Dr. Brehmer asserts that in the neighbourhood of Görbersdorf, in Silesia (1700 feet), he has never seen phthisis amongst the inhabitants.

These statements seem to point clearly to the conclusion that the freedom which any particular locality may appear to enjoy from this disease is independent of its mere elevation, and due in part to other conditions. This view is further supported by the fact that at Andermatt and at Splügen, each about 4700 feet above the sea, phthisis is known to occur, while at Klosters, which is 700 feet lower, it is unknown.

Moreover, it has long been known that a sea voyage is, in some cases, one of the most effectual means at our disposal for arresting the progress of phthisis. It would seem then that under certain conditions the *sea-level* is as curative of consumption as the highest inhabited valleys.

One of the conditions common to life during a sea voyage and to life in a high mountain valley, is the mechanical purity of the air that is breathed, and its entire freedom from organic admixture. We know that the air of large densely-populated cities and towns is filled with impurities, both organic and inorganic, and doubtless in many localities this floating dust is largely composed of filthy putrescent organic matter, or infective particles, capable under certain circumstances of exciting or conveying disease. It is amongst those who have to live in the worst parts of this unwholesome town atmosphere that phthisis is most rife and fatal; and therefore to the absence of these impurities in the air of elevated regions, as well

as in that of the open sea, we may reasonably attribute their beneficial influence in preventing or arresting tubercular disease.

Most of the localities which have been mentioned above as enjoying an immunity from tubercular disease of the lungs, are characterised by a pure and dry atmosphere, a dry subsoil, and a scanty population.

And it has been shown that in certain favoured localities in our own country, where these conditions of dryness of subsoil, thinness of population, and purity and dryness of the atmosphere co-exist, there also the occurrence of cases of phthisis is very rare. Too much importance must not be attached to the statements made by medical men who reside in high *and very thinly populated* districts—such, for example, as the Upper Engadine or the Davos Valley—to the effect that cases of consumption are rarely observed there. These statements are no doubt perfectly true, but what is their value?

If consumption be a disease engendered by city life, by malaria, by overcrowding, by breathing a damp contaminated atmosphere, we should expect it to disappear in localities where all these conditions are reversed.

It may be interesting to inquire briefly into the nature of the evidence upon which reliance is placed to support the view that elevated districts are those best suited to phthisical patients.

Before we were in possession of all the evidence that has been derived from the results of the past ten years' experience at Davos, the strongest and the most unequivocal was that derived from the experience of medical practitioners resident in the large towns at the base of the Peruvian Andes, and in other similar tropical stations.

In these localities consumption is very rife, and it has long been the established mode of treatment there to remove the patients so afflicted, as early as possible, to one or other of those sheltered valleys at great elevations, which the slopes of the Andes afford

in abundance. Dr. Archibald Smith, of Lima, was one of the first to call the attention of the medical profession to this method of treatment. He stated the fact that in the Peruvian Andes immunity from phthisis was commonly observed at an elevation of between 7500 and 8500 feet. No plan of treatment could be more rational than to remove the consumptive patient from the hot, damp, reeking, malarious atmosphere of the densely-populated town in which he had been attacked, to the pure, clear, dry, invigorating air of the adjacent mountain valleys. There is no need to marvel at the efficacy of such a process, nor does it afford any reasonable ground for assuming that, *in every part of the world*, very elevated mountain valleys are the best localities for the treatment of phthisical cases. It is very well known that, in temperate climates, some moderately elevated regions enjoy a greater immunity from tubercular disease than others of perhaps twice their altitude. Local conditions other than the single one of mere elevation determines the suitability or otherwise of each particular district. When this discussion first commenced, the advocates of Davos and the Upper Engadine as winter sanatoria for consumptive patients, who were not so numerous then as they are now, laid much stress on the statement that scrofulous disease was unknown among the natives of the Upper Engadine and of the Davos valley; and that when the inhabitants of the lower districts of Switzerland became affected with scrofula, they were restored to health on migrating to these districts. We were further told, that although fatal cases of consumption had occurred there, the disease had invariably been imported.

But we had to place against this statement another, which was also made on the authority of the medical men residing at these places, to the effect that deaths from inflammation of the lungs, from pleurisy, and from catarrhal fever were common; and we could not help associating this with another undoubted fact, namely,

that consumption is a common sequel in our own country to these inflammatory affections; and we were then compelled to ask the question: Would not many of these acute attacks which prove rapidly fatal in the Engadine have merged, in a warmer climate, into those chronic conditions which are never developed there because of the fatal severity of the primary disease?

But when we had admitted the full significance of the fact that the natives of these localities were free from tubercular disease, it was met by another fact, viz. that such was also the case in many parts of Europe, at not more than half this elevation, where the population was sparse, and the atmosphere dry and pure. Many such places are known, and a diligent search would probably discover many more. One important fact appeared to come out of the inquiry so far as it had at that time advanced, viz. that a moderate elevation of 1500 to 3000 feet was as useful in some parts of the world as an altitude of from 7000 to 10,000 feet in others.

So long ago as October 18th, 1869, I called attention in an article in the "*Medical Times and Gazette*" of that date, to the reputation that Davos was gaining as a winter resort for consumptive patients. After alluding to St. Moritz as a winter station, I observed: "A far greater number of persons with pulmonary complaints have wintered of late years at Davos. This is situated in a valley running parallel with the Engadine, at a somewhat lower elevation, 5105 feet above the sea. It is reached by diligence from the Landquart station, close to Ragatz, through the valley of the Prättigau, in about six hours. It is also connected by several mountain passes with the Engadine, one of which, the Fluela Pass, is traversed daily by diligence. This also is about six hours journey—i.e. from Sûs, in the Lower Engadine, to Davos Dorfli, in the Davos valley. At the time of my visit to Davos I was informed that there were nearly one hundred and fifty patients undergoing the 'cure'

there." From other sources I learn that that number ought to have been reduced to seventy.

In the winter 1872-73 the number of winter visitors (patients) had risen to two hundred; in that of 1874-75 to four hundred; in 1875-76 to five hundred; and in that of 1878-79 to seven hundred. And the number has continued to increase so rapidly that, as we shall presently see, an outcry has lately been raised against overcrowding there, and its evil consequences.

But leaving Davos for the moment, let us inquire what has been the fate of St. Moritz as a winter sanatorium. When I first wrote on this subject in 1869, it was with regard to St. Moritz rather than to Davos that the interest of English physicians had been aroused. One of the earliest records of a winter passed at St. Moritz by an invalid is to be found in the visitors' book of the Kulm Hotel for 1868-69, from which the following is extracted :

"Any doubts we had entertained as to the possibility of keeping warm indoors in a locality where, in the open air, the temperature was often below zero Fahrenheit in the shade, were speedily dispelled. Owing to the extreme dryness of the air, we never found our sitting-room comfortable above 56 degrees Fahrenheit. The rooms are warmed by means of stoves, not open fireplaces, consequently the chief difficulty is to ventilate them properly; to do this effectually, we left our sitting-room for five minutes every two hours, opening all the doors and windows. A pan of water kept on the stove is also indispensable to prevent the already dry air of St. Moritz becoming overdried. On an average, we were out four hours daily, walking, skating, sleighing, or sitting on the terrace reading—this latter two or three hours at a time; twice in January we dined on the terrace, and on other days had picnics in our sledges: far from finding it cold, the heat of the sun is so intense at times that sunshades were indispensable, one of the party even skating with one. The brilliancy of the sun, the blueness of the sky, and the clearness of the

atmosphere quite surprised us. The lake affords the opportunity, to those who love the art, of skating without interruption for five months. The ice has, to a certain extent, to be artificially maintained. To do this, we, with other English friends, formed a small club—First, for keeping a circle clear of snow; second, for renewing the surface whenever it became impaired by turning a stream on to it.

“I must state, having spent part of the winter of 1867–68 at Mentone, that I derived far more benefit from that of 1868–69 spent at St. Moritz. The change from England to Mentone did me good at first, but latterly I experienced great lassitude; whilst at St. Moritz I was far stronger at the end of the winter than at the commencement. During the whole time I had neither cold nor cough, though I was out all weathers.

“One or two days the sun-heat was remarkable, the thermometer reading 142 degrees Fahrenheit; on the other hand, the greatest cold was $-18\cdot5$ degrees Fahrenheit—viz. $50\frac{1}{2}$ degrees below freezing-point—during the night.

“We left St. Moritz for Lugano and Cadenabbia at the end of March, to escape any damp the spring thaw might create; but experience taught us that the uncertain spring weather of the plain causes far more injurious damp than the mere thawing of the snow at such a height as St. Moritz. There the disagreeable effect of a temporary and most unusual thaw in February (brought on by a warm wind and great sun-heat) appeared to be confined only to the melting of the snow on the roads and mountains, off which it ran as rapidly as it thawed, imparting no perceptible damp to the air. In the plain we had plenty of rain, snow, and mist, and on fine days it became too warm and relaxing. We thought to better ourselves by spending May on Monte Generoso, where there is a good well-managed hotel in a charming situation, about 4000 feet S.M.; but that is too uncertain a month for this mountain. Although we have had some fine days, we

have been most frequently in the midst of clouds, rains, or storms. The group of mountains of which Monte Generoso is the most southern seems to attract the clouds that rise from the vast Lombard plains, over which to the Apennines the view is unbroken. St. Moritz, being so much higher, is above the ordinary cloud-level, and consequently gets less rain; most of the clouds, of which there are not a few in summer and autumn, seem to be carried rapidly over the Engadine by strong currents of wind."

Additional experiences of the winter of 1869-70 at St. Moritz appeared in *The Times* of February 21, 1870. The writer, after describing the means adopted for providing a "beautiful surface" for skating on the St. Moritz lake, goes on to observe :

Last winter, on January 24th, the minimum thermometer (not exposed to the sky) registered $-18\cdot5$ degrees Fahrenheit, i.e. $50\frac{1}{2}$ degrees of frost ; this season the lowest temperature has been -13 degrees Fahrenheit on the 24th ult. The same night, at the Government Meteorological Station, a few miles distant, it was $-19\cdot3$ degrees Fahrenheit. The January thermometer mean is $16\cdot31$ degrees, that of the minimum $5\cdot56$ degrees. From the 10th of October the minimum was continuously below freezing-point, on the 29th falling as low as 1 degree Fahrenheit.

These few particulars show the severity of the winter here. Of its accompanying delights I am afraid I can give your readers but a faint idea. Sleighing, which is very enjoyable, is in vogue for about six months in the year, but nothing short of an actual trial would enable anyone to realise the pleasure of gliding along rapidly in a sledge, under a brilliantly blue sunny sky, with the crisp white snow beneath.

Another favourite entertainment is sliding down steep inclines on small sledges constructed for this purpose. The speed attainable is almost incredible. In this sport both old and young join.

The roads are quite good for walking on, since the snow is generally dry and well trodden. Anyone more ambitious can easily overrun the country on snow-shoes. The snow is rarely more than two feet deep, except where it has drifted.

There is usually very little wind, and the clear frosty air is so invigorating, the sky so cloudless, and the sun's rays so penetrating, that the cold is scarcely felt. The chilly feeling associated with the winter in England is, many say, unknown here, owing to the above causes and the dryness of the climate. Of course, there is exceptional weather, and this has been, to a

certain extent, an exceptional winter here as everywhere. The rain which has fallen in such abundance in Italy and elsewhere has had its counterpart here in more frequent falls of snow and cloudier skies than usual. My description refers to what an English friend of mine, who has spent five winters here, calls the "normal" Engadine winter weather, such as I have experienced fully the whole of last and part of this winter.

The following is from a private letter written from Samaden the same winter (March, 1870), and is also interesting from what may now be regarded as a historical point of view:

I have spent five months (from October 10th to February 26th) at St. Moritz, and liked the place on the whole, and the climate, I think, has done me good. During the winter we have had some splendid weather, little or no wind, very dry, and sometimes very cold. It is the *best* climate I have *ever* lived in, the air is so beautifully pure and dry. Of course we have had our share of unpleasant weather, especially at the beginning of the winter, when the snow was coming down; but snow every day is far preferable to rain, and it is rarely accompanied by much wind.

Our party at the Kulm Hotel has consisted of four English, three Germans, three Italians, and a French lady; in Mr. Stretzell's house there have been four more English people besides himself. In this place (Samaden), which is only three and a half miles from St. Moritz, but at a slightly lower elevation, there has been one English family, consisting of a lady and gentleman and five children. That, I think, is a complete list of the visitors who have passed this winter in the Upper Engadine.

The great drawback in spending the winter at St. Moritz is the want of good food. The milk and bread and butter are good; but the meat is bad, and the soup invariably requires a certain amount of "Liebig's Extract" to make it worth eating. For three months the only vegetables we had were potatoes. In fact, a person coming here for health gains greatly as regards climate, but loses greatly from want of good food and the ordinary home comforts. As for amusements, we have sleighing, a little skating, and also billiards. There are no level walks about St. Moritz, but the hotel has a terrace; here (at Samaden) there are three level walks, and no terrace. I mention this because, when the country is all covered over to a depth of two or three feet with snow, it is of great importance to have some place to take a constitutional. In a place of this sort you are thrown very much on your own resources, and if you can sleep twelve hours out of the twenty-four, you can manage to get through the time.

Notwithstanding advocacy such as this, St. Moritz

has hitherto been quite unable to compete with Davos as a winter resort. While the number of winter visitors to Davos had increased from seventy in the year 1869-70 to five hundred in the year 1875-76, we find a writer in a daily paper of the latter date stating of St. Moritz :

No one has had the hardihood to pass the winter either there or at the Berinahof at Samaden since 1872 until the present season, notwithstanding the favourable testimony as to climate, comforts, and amusements of the very few who stayed through that and the three preceding winters.

And he very appropriately adds :

Several proprietors of hotels and *pensions* at St. Moritz advertise that their establishments are open the whole year, inspired partly by the success of Davos (between the Unter Engadine and the Prättigau) as a winter residence for consumptive patients, partly by the well-known inclination of some eminent doctors towards a dry-cold in preference to a damp-warm climate in certain stages of lung disease. They scarcely seem to realise, however, the extent to which provision must be made for delicate patients above the requirements of ordinary summervisitors, or even of themselves in winter. Double windows, adequate means of heating rooms and passages, carpets, arcades, and loggias for exercise in bad weather, indoor amusements, such as billiard-tables and pianos—all these the doctor recommending a novel and extreme treatment should be able to guarantee. Such provision has doubtless materially assisted the increasing success of Davos.

Writing on the 30th October, he says :

Already I have experienced the novel situation of being unable to sit out on the snow because of the heat of the sun's rays, intensified by the universal whiteness, being at times quite overpowering.

He concludes by bearing testimony that the evil reputation the Engadine once had in the matter of food is no longer merited, and that the most exacting and fastidious need no longer complain against either the quality or the cooking of the food.

Always desirous of accumulating independent testimony both with regard to the climate of the

Engadine and of Davos during the winter, I obtained from a gentleman, who was himself unfortunately the subject of consumption, and who, I regret to say, is since dead, some of his personal observations both at St. Moritz and at Davos. Writing to me at the end of September, 1876, from St. Moritz, he says :

My wish has been to remain here if possible for the winter, but I think I shall shortly return to Davos nevertheless, as the winds here are decidedly trying and the cold has annoyed me somewhat. I find that, although in truth the two climates may be substantially the same thing, my bronchial susceptibility makes the Engadine too keen and searching. Then it must be admitted that all invalids would not find the winter arrangements here sufficiently comfortable for bad weather. It appears to me that Davos is considerably sheltered from wind, though of course it does not enjoy complete freedom from it. What place does ?

Then in speaking of the domestic arrangements at Davos he says :

There are white porcelain stoves, from six to nine feet high ; they keep warm, if necessary, all night, but I never felt the need of much fire in my bedroom, as the rooms are very well built, not very large, but free from draughts. Double windows are used everywhere. I wore the same clothes as in winter in England in the house, but out of doors, quite a third of the time, wore only a light autumn overcoat. I think people wore perhaps rather more than in winter in England—certainly than in the South. *The feet should be protected by felt overshoes.* The snow in the road is usually hard and pleasant to walk upon ; except in spring, it is always good under foot, then it is *awful*. Sunshades are useful for ladies in winter, as are blue veils, spectacles, etc. I saw no snow blindness such as I have had myself in Colorado. Colds in the head are decidedly not nearly so common as in England, and are very quickly got rid of. Rheumatism I heard nothing of, but am inclined to think it might be brought on by exposure, but only such as would bring it on anywhere. I feared myself the depressing effects of a low temperature, but did not suffer at all from it or hear of others doing so. I am feeling similar effects here [at St. Moritz] just now, which makes me incline to Davos. I hear [at Davos] of sudden attacks of hæmorrhage, and in cases liable to it I should not think Davos good. People must not expect to find innumerable expeditions [at Davos] as here [at St. Moritz], but there are a few nice ones. Sleigh-driving is very enjoyable in the sunny, warm, cloudless winter days. There was [the preceding winter at Davos] six weeks' or so excellent skating,

and a few picnics on the ice, ten days' skating on the lake, the remainder in a rink. There used to be a band on the rink and many spectators. Davos appeared to be a fine place for children, as they looked well and were hardy. I saw them in winter, with no extra clothing or hat on, playing about.

The same gentleman, having passed a second winter at Davos, wrote twice again the following summer from St. Moritz.

I left Davos the 4th of June, and have been here since. Throughout the winter I did very well, hardly ever remaining in doors a whole day (not more than three or four times). I was able to walk regularly and also to skate in December and January; my appetite was good, and though the food was not as suitable as it is here, I always managed to make good meals. I slept well; but one thing I found trying used to be the heat of the sitting-rooms at the Hotel —, which is a very small house. There were some twenty English all the winter (1876-77) at Davos. Among the twenty-five to thirty-five guests at the Hotel — there were several deaths, some of them people who certainly came much too far gone, but one or two in which it seemed that the peculiar air brought on an increase of disease.

After giving the particulars of a case in which a severe and fatal illness appeared to have been induced by "the exceptional excitement, etc. of the climate," he adds:

Other deaths in the house were very sudden, and I knew of some cases of sudden attacks of hæmorrhage. There was a lady in the hotel who made great improvement, and she and I were supposed to do most credit to the place. In one or two cases where there was no disease, but weakness and want of stamina, people seemed to have gained considerably when they left. I am sure for dyspepsia the climate is a wonderful remedy. The place was very dull, of course, and rather depressing; but as I got on well, and had been so ill on arriving, I could not complain of that. As soon as the spring began I felt less well, and since the weather has been warm have had more coughs, etc. The temperature went very low at Davos this winter; I think some 8 or 10 degrees below zero Fahrenheit. There was an immense quantity of snow, which fell mostly after the middle of December. I stayed at Davos through the snow-melting time, as I could not think of any place better for me, and I found it no more unpleasant than much of the winter weather, and I do not think very much damper, though being warmer it was the more relaxing.

Since these letters were written, the merits of Davos as a winter station have been repeatedly before the public and the medical profession; and the number of winter residents has increased to such an extent that one of its most distinguished literary supporters and advocates, Mr. J. E. Symonds, writing in the *Pall Mall Gazette* from that place in January of this year, says :

The Nemesis which attends sudden prosperity already hovers over Davos, and if the place increases at its present rate the ruin will be as speedy as the rise.

Four years' experience has not shaken my belief in the value of a high mountain climate for certain classes of pulmonary invalids; though I am bound to say that the hopes I entertained and publicly expressed after a few months' residence in Davos have been considerably damped by what I have since observed. At the same time this long experience convinces me that the principles upon which an Alpine cure can be expected have been steadily neglected here. When I first knew the place it was a little village, furnished with a few hotels for the reception of strangers. The life was primitively simple, the air quite pure, the houses far apart and of moderate dimensions. Since then it has rapidly expanded, and the expansion has brought the following bad consequences: 1. There is now a perceptible cloud of smoke always hanging over the valley, shifting with the wind, but not escaping, and thickening the air to a considerable extent. This smoke arises mainly, doubtless, from chimneys; but it reminds one of the breath of many hundreds of consumptive patients aggregated at close quarters. 2. The houses, which have sprung up like mushrooms, are built with so little attention to the requirements of a sanatorium that the main promenade is more than half in shadow. 3. The drainage of the whole place is infamous. One portion of the village carries its sewage down into a marsh, where it stagnates. Another portion is drained into the stream, which in winter is a shallow, open, ice-clogged ditch, exhaling a frozen vapour. To walk by the course of this river is now not only disagreeable but dangerous. The largest hotel frequented by the English has a horrible effluvium arising from the cesspool beneath its windows. In the largest hotel frequented by the Germans, a species of low fever has recently declared itself. 4. The social amusements of a watering-place have been greatly developed. Dances, concerts, theatres, bazaars, private theatricals, picnics, are multiplied. Some entertainments of the sort are no doubt not only necessary, but also beneficial. Yet it must be remembered that the peculiar severity of Alpine winter, the peculiar conditions under which consumptive people

meet together here, crowded into rooms artificially heated with stoves, render all but the simplest forms of social gathering very dangerous.

The only way of averting some serious catastrophe from a health resort which has deserved popularity, and the principle of which is excellent—the only way of preventing Davos from being converted into an ill-drained, over-crowded, gas-lighted centre of cosmopolitan disease and second-rate gaiety—is to develop rival places of the same type. The valley of Davos proper, from Davos Kulm or Wolfgang down to Frauenkirch, may be said to be already exhausted for building purposes. This valley is so narrow and so much enclosed with mountains that the further development of any one of its hamlets is certain to injure the whole neighbourhood. Its torrent is too thin and hampered in its course to act as common conduit-pipe for drainage. Its boasted absence of wind causes the addition of smoke from chimneys or of exhalations from cesspools to be immediately felt in all parts of the district. If Davos is to remain what it calls itself—a Luft-Kur-Ort, or “Health resort of sun and air”—it must learn rather to contract than to expand. I have touched upon some of the obvious dangers which threaten Davos. I might have gone into more alarming problems, and have raised the question whether the accumulation of sick people in big hotels, which are really consumptive hospitals, though not subject to the precautions used in consumptive hospitals, is not attended with the gravest disadvantages. So long as the hotels remained small, and there were only a few of them in the place, the peril from this source was slight. But the tendency at Davos has been to enlarge each of the well-established *pensions*, to pack the patients together in as small a space as possible, and to build new inns at the doors of the old ones. All this is done in a climate where winter renders double windows and stove-heated buildings indispensable. All this is done for a society where the dying pass their days and nights in closest contiguity with those who have some chance of living! Within the last few weeks two cases have come under my notice, one that of a native of Davos attached to the service of the visitors, another that of an English girl, who have both contracted lung disease in the place itself, owing, as I believe, to the conditions of life as they have recently been developed here.

Mr. Symonds' former able advocacy has done so much for Davos that this timely warning of his ought to be laid to heart by those directly interested in the prosperity of the place, and by those who, perhaps, somewhat too indiscriminately recommend its winter climate to consumptive patients; for the advocates

of Davos, both in the medical profession and out of it, have become numerous and influential, and the cases which have undoubtedly derived great benefit by wintering there now amount to a considerable number. Personally, I have long been fully convinced of its importance and value as a winter sanatorium in suitable and carefully selected cases. But it would be unfair and disingenuous to conceal the fact that my personal knowledge of the experiences of winters at Davos is by no means unchequered by calamities, and some fatal occurrences there have been exceedingly sad and unexpected. The experience of different writers has varied also greatly as the seasons themselves have varied.

A writer who is most friendly to Davos* thus expresses himself on this point:

Another objectionable feature is the strong desire that exists among the local medical men, and others financially interested in the place, to suppress the number of deaths that annually occur, in order to give a false impression as to the marvellous powers of the climate to delay death. In fact, we do not hesitate to say that in not a few cases patients who were known to be hopelessly ill have been hurried elsewhere by order of the medical men, for no other reason than that the Davos death-rate might be kept low. We anticipate that this statement will lay us open to criticism, if it does not beget flat contradiction; but, fortunately, we are in possession of the most reliable data to prove what we have written.

As I have already said, Davos is situated in a mountain valley in the Grisons, which runs parallel with the upper valley of the Inn, at a distance of about twenty miles north of it. Dr. Frankland makes it 5352 feet above the level of the sea, which is a somewhat higher estimate than the one hitherto current. It is then of just the same elevation as the village of Mürren, which is 5348 feet above the sea, and only a little lower than Samaden, which is about 5600 feet. But it is not its particular elevation alone which gives to Davos its special suitability as a winter

* "Davos Platz as an Alpine Winter Station," by J. E. Muddock.

resort ; for, as we see, Mürren and Samaden, so far as mere elevation is concerned, ought to answer equally well. We must seek, then, in other local conditions for the characteristic qualities of the climate of Davos. So far as purity and rarefaction of the air are concerned, it is in almost precisely the same position as the adjacent Engadine valley. It is probably only in the greater stillness of the atmosphere, and in protection from the prevailing local winds, that Davos presents any special advantages in winter over such resorts as St. Moritz, Pontresina, or Samaden. And now that the outcry has been heard, and heard so distinctly, of the overcrowding of Davos and its consequent evils, it becomes a question of some interest to what extent and in what cases other Alpine resorts may be equally useful as winter sanatoria. Dr. Frankland observes ("Proceedings of Royal Society," vol. xxii. p. 317) :

The summer climate of Davos is very similar to that of Pontresina and St. Moritz in the neighbouring high valley of the Engadine—cool and rather windy ; but so soon as the Prättigau and surrounding mountains become thickly and, for the winter, permanently covered with snow, which usually happens in November, a new set of conditions come into play, and the winter climate becomes exceedingly remarkable. The sky is, as a rule, cloudless, or nearly so ; and as the solar rays, though very powerful, are incompetent to melt the snow, they have very little effect upon the temperature either of the valley or its inclosing mountains, consequently there are no currents of heated air, and as the valley is *well sheltered from more general atmospheric movements, an almost uniform calm prevails until the snow melts in spring.*

And Mr. Symonds, speaking from long personal experience, says of the winter climate of Davos :

The position of great rocky masses to north and south is such that the most disagreeable winds, whether the keen north wind or the relaxing south, known by the dreaded name of *föhn*, are fairly excluded. Comparative stillness is a great merit of Davos ; the best nights and days of winter present a cloudless sky, clear frost, and *absolutely unstirred atmosphere*. March is apt to be disturbed and stormy, and during the summer months there is a valley-wind, which rises regularly every morning and blows for several hours.

The valley is from ten to fifteen miles in length, and its direction is from north-east to north-west. It is only about half-a-mile broad, and protecting mountains rise on each side to the height of from 2000 to 5000 feet above the level of the valley. About three-quarters of a mile above Davos Platz to the north is Davos Dorfli, a sunnier spot than Davos Platz, but perhaps not so well protected from wind. Still farther north is the Davoser See, or the Lake of Davos, which affords good skating until it becomes too thickly covered with snow.

At the S.W. extremity the valley is also well protected and closed in by high mountains. The Upper Engadine is, on the contrary, much exposed in this direction, and it has often been observed that storms and bad weather frequently reach this valley over the low pass of the Maloya. Then again, there are no extensive glaciers and snow-fields in the immediate vicinity of the Davos valley as there are in the neighbourhood of the Engadine, and especially of Pontresina. The smaller size of the valley, both in length and breadth, and the nature and position of its mountain barriers, with the absence in its immediate neighbourhood of great snow and ice fields, no doubt contribute to make the winter climate of the Davos valley a milder one than that of the adjacent valley of the Inn, and therefore better suited to a large class of invalids. But it is a question whether the more vigorous class of pulmonary patients, as well as those who have gained vigour and amendment at Davos, would not benefit as much, or perhaps more, in some of the Engadine resorts, and St. Moritz is perhaps the best situation in that valley for winter residence.

The winter snowfall in the Davos valley, as well as in the Engadine, usually begins early in November. An early and heavy snowfall of three or four feet is considered to promise a good winter. The snow continues to fall through November and a part of December. In the roadways it gets beaten down to a

depth of three or four feet. In good seasons, fine settled weather, with absence of snowfall, sets in before the end of December. The atmosphere becomes still and calm, the air intensely cold and dry, and absolutely clear. At night the brilliant starlight, or the cold silvery moonlight streaming over the snow-mantled valley, gives it an aspect of singular beauty. The temperature at night often falls very low, frequently some degrees below zero. The days are cloudless, with an intensely blue sky, and an amount of heat from solar radiation which enables invalids to pass hours sitting in the open air; and the brilliancy of the sunshine in midwinter makes umbrellas and sunshades essential for protection. The instant however the sun is withdrawn the intense coldness of the air makes itself felt, and a fall of 50 or 60 degrees Fahrenheit is common immediately after sunset. Of course all delicate invalids should be indoors before this hour. Owing however to the great dryness of the atmosphere, and the absence of wind, the extreme cold at night is by no means so much felt as might be expected. "There are no patients," says one of the local physicians, "who cannot, if they are so inclined, sleep with safety with an open window during the winter." "I was recommended," says Mr. Symonds, "to be in the open air from sunrise to sunset, to walk for two hours in the open air before going to bed, and to sleep with open windows. The invalid can take more liberties with open air at Davos than anywhere else."

Unfortunately, weather at Davos is fickle sometimes, as it is elsewhere, and a remarkably fine winter may be preceded or followed by a remarkably bad one. The winter season of 1879-80 was an exceptionally fine one, whereas the preceding winter, 1878-79, had been an unusually bad one, and had proved disastrous to many invalids there. The relaxing south wind, the *föhn*, prevailed to a great extent, in consequence of which the snow thawed at times in midwinter, and colds, which are rarely caught at Davos,

were common. The following winter however many cases did remarkably well, and "wonderful recoveries" were numerous. There was almost an entire absence of wind, the air was remarkably dry and bracing, and for three months there was almost uninterrupted sunshine and clear unclouded skies. Then followed in 1880-81 another bad winter. "Davos Platz proved as capricious and fickle as our own damp and misty island. The snowfall did not set in until late, and then it was singularly light, while a high temperature and fogs and wind were the rule and not the exception. Those people who derived any benefit were in a very small minority, while the death-rate amongst the visitors rose to an alarming extent."*

I have before me some records of the weather at Davos during three winter seasons. The first refers to the winter season of 1875-76. It is very brief, and divides the days into "clear and fine," "moderately fine," and "bad."

	Clear and fine days.	Moderately fine.	Bad.
In November there were	12	3	15
„ December „ „	19	10	2
„ January „ „	14	12	5
„ February „ „	12	11	6
„ March „ „	10	9	12

So that out of a total of one hundred and fifty-two days, there are sixty-seven clear fine days, forty-five moderately fine, and forty bad days. The two worst months being November, when the snow begins to fall, and March, when it begins to melt. I take these figures from Mr. Holsboer's "Die Landschaft Davos," and I presume they are intended to represent a good specimen of winter weather there.

If we next take the winter of 1879-80, "perhaps one of the most perfect ever known in the Alps," and include the month of October, we find the days may

* J. E. Muddock, "Davos Platz as an Alpine Winter Station."

be divided into "cloudless," "fine, but not cloudless," "cloudy," and "rain or snow."

	Cloudless.	Fine, but not cloudless.	Cloudy.	Rain or snow.
October had	18	4	3	6
November „	5	4	7	14
December „	14	6	6	5
January „	15	7	5	4
February „	8	7	8	6
March „	16	5	3	7

The first column includes only absolutely cloudless days, and in the second column are included days that are described as "glorious, a few white clouds," while the fourth column includes days when snow or rain, however little, fell. Out of one hundred and eighty-three, then, there were one hundred and nine fine days, seventy-six of which were cloudless, thirty-two days more or less overcast, and forty-two days on which rain or snow fell, fourteen of these being in November. October maintained its character for being one of the finest months in the Alps.

Let us now examine the records of the next winter, that of 1880-81:

	Cloudless.	Fine, but not cloudless.	Cloudy.	Rain or snow.
October had	6	2	15	8
November „	10	6	9	5
December „	8	7	6	10
January „	10	9	10	2
February „	7	7	6	8*
March „	10	3	11	7

Mist or fog is mentioned as occurring four times during this winter: once in October, once in November, and twice in March. "No wind *in the valley*" is stated of no less than one hundred and thirty-four days, and "no upper current" on forty-one days, and a strong wind is only mentioned on five days in the whole winter. It has already been said that this was a very unfavour-

* Snow fell on eight consecutive days.

able specimen of a Davos winter; there were only eighty-five fine days against one hundred and nine in the preceding winter, and fifty-one against seventy-six cloudless days. And although there were fewer days (forty to forty-two) on which snow fell, the distribution of the snow-fall was less advantageous. The heavy snow-fall in November of the former winter was followed by a continuation of magnificent weather, whereas the small snow-fall in November of this season was followed by frequent snow-falls in December and eight consecutive days on which snow fell in February. But perhaps the most remarkable and characteristic fact which comes out of this meteorological record is the singular absence of wind in the valley. It is this peculiar stillness of the air that enables the invalid to support so well its comparatively low temperature; so that he is not chilled and depressed by it, but, on the contrary, is braced and exhilarated.

Owing to the absence of aqueous vapour in the clear dry air of this elevated region, the intensity of solar radiation on perfectly clear days is remarkable; and, according to Dr. Frankland, at Davos Dorfli, on the 21st December, 1873, at 2.50 p.m., the "mercurial thermometer with the blackened bulb *in vacuo*" recorded 113 degrees Fahrenheit, and on the same day at Greenwich the maximum reading, obtained by the same method, was 71.5 degrees, giving a difference in favour of Davos of 41.5 degrees Fahrenheit. But a maximum of solar radiation amounting to 153 degrees Fahrenheit was obtained on the 31st January, 1881, while on the same day the maximum temperature of the sun in the shade was 42.5 degrees and the minimum 18 degrees Fahrenheit. So that the difference between sun and shade temperature is enormous. The lowest temperature recorded during the winters 1879-80 and 1880-81 was 16.7 degrees Fahrenheit—i.e. nearly 17 degrees Fahrenheit below zero on 9th December, 1879. The mean daily minimum for the same month was 5.5 degrees Fahrenheit, and the mean daily maximum 23.13 degrees Fahrenheit. The maximum sun temperature

was 138 degrees Fahrenheit. This was during a month of the finest Davos winter weather ; the amount of aqueous vapour in the air being exceedingly small, and the readings of the hygrometer very low, as low as 30 degrees (!) on one day and never over 38.5 degrees. Owing to the overcrowding and to defective sanitary arrangements, chemical examination of the air in Davos itself has shown that it is by no means so pure as it should be, or so free from admixture with organic impurities as has been imagined. This is much to be regretted, as many invalids may not be able to get away to breathe the purer air on the mountain-side. The want of efficient drainage is reported to be very much felt.

Of the drainage [says a recent writer] we feel bound to say that it is about as bad as it can be, while heaps of offal, cow-dung from the cow châlets, and other indescribable filth are allowed to lie exposed near the road, thereby not only offending the sight but the smell, as well as tainting the atmosphere. It is true that during the intensely cold winter months the low temperature and the snow prevent ill-effects from this disgraceful sanitary neglect ; but the evil is there nevertheless, and it makes itself manifest in more ways than one as soon as any appreciable rise in the thermometer takes place. After this the reader will not be surprised to learn that typhoid and other fevers, if rare, are no strangers to the valley.*

It would seem then to be incumbent on English physicians to consider whether there are not other resorts in the high mountain valleys of Switzerland to which invalids may be sent to winter, where they may escape the evils of overcrowding and overbuilding, which appears so rapidly to have overtaken Davos Platz.

Of all the places at present known, St. Moritz seems to offer the greatest attractions. It has already been tried and found to answer exceedingly well in a certain number and class of cases. No doubt it is not so well suited as Davos to the feebler classes of pul-

* "Davos Platz as an Alpine Winter Station."

monary invalids, who are also the victims of more advanced disease. But to many of the stronger patients, and to those in whom disease is in its earliest stage, or very limited in extent, or to those who are suffering only from general loss of tone, St. Moritz may prove as useful, or even more so, than Davos. Moreover, at the Külm Hotel at St. Moritz invalids will now find a winter sanatorium, furnished with appliances and provided with extensive apartments and other conveniences, which it would be difficult to find in many of the hotels at Davos. Open fireplaces, so dear to the English mind, are to take the place of the close German stove, and no effort, we understand, is to be spared to make the winter life of the invalid cheerful and comfortable. The hotel possesses an excellent covered terrace for sitting out in, and a skating-rink is also close at hand. An English physician is to be established in the hotel all the year round—another consideration of some importance to invalids who do not speak German. St. Moritz also has the advantage of being within easy reach of Davos, so that a patient who finds the climate of the Upper Engadine unsuitable can easily remove to the Davos valley.

After passing a winter in the snow, one of the difficulties always has been what to do when the transitional season of spring sets in, and the snow begins to melt. Some boldly face the inconvenience and remain where they have wintered, and so far as we can learn, without taking any particular harm. Still, no doubt there is a craving for a little change when spring with its disagreeable and relaxing weather reaches the snow-covered valley. To return to England at once seems scarcely advisable, knowing especially what our own spring weather is like. To seek some other intermediate mountain station, of lower elevation, for a few weeks before descending to the sea-level would perhaps be the best thing to do, if such suitable stations were easily found. But there are difficulties in doing this. Many of the summer resorts between

2500 and 3500 feet above the sea are not open and available at this season, and in those that are available the accommodation is perhaps not such as invalids require. Moreover, even if a suitable intermediate station is found, it will occasionally happen that pulmonary invalids find themselves worse for the change ; and begin to think they have been ill directed in their choice ; whereas they should bear in mind that the spring is a difficult season everywhere, especially for those who suffer as they do.

Thusis, 2448 feet above the sea, is convenient and accessible, but little is known about its spring climate. Fair accommodation can be obtained there, and it has the advantage of being on the way homeward.

Seewis, nearly 3000 feet above the sea, a village in the Prättigau, quite close to Landquart, is exceedingly conveniently situated, in a picturesque position, and, we are assured by those who have spent a whole winter there, has excellent accommodation.

Glion, above Montreux, on the Lake of Geneva, also about 3000 feet above the sea, is a pleasant sunny station, with very good accommodation and most picturesque and cheerful surroundings ; but it is rather out of the way for those who are returning to England.

Heiden, 2660 feet above the sea, near Rorschach on the Lake of Constance, is also conveniently accessible and in a pleasant situation, but it would probably be found dull and unprepared for spring visitors.

In conclusion, two questions must be briefly dealt with : First, what class of invalids may fairly expect to derive benefit from wintering in these high mountain valleys ? and, secondly, what are the curative agencies at work there ?

It is of the first importance to remember that these mountain climates are by no means adapted to the treatment of many well-defined forms of consumption ; that cases have to be selected with great care and discrimination ; and that regard must be had rather to the constitution and temperament of the individual than to the mere amount of local disease.

Hereditary predisposition, other circumstances being favourable, offer no counter-indication to the suitability of these stations. But their remedial power is especially manifested in persons who have become accidentally the subjects of chronic lung disease, and who were the possessors of an originally sound constitution, and have obvious reserve stores of physical vigour: the constitution must have the power of healthy reaction to the exciting stimulants here applied to it. The extent to which this reaction often occurs has occasionally led to grave and even fatal indiscretion. It is the universal experience of physicians that the phthisical constitution is the most difficult of all to control; consumptive patients are forever committing indiscretions which are perilous to themselves and in the last degree exasperating to their doctors. Cautions against over-excitement and over-exertion are therefore especially needed in climates such as we have been considering. The following summary of cases suitable to those high mountain health resorts is founded on the published testimony of a physician, whose practical experience in one of them has extended over twenty years; and in the statements which follow my own experience is in accordance with his.

1. Where there is an obvious and well-ascertained predisposition to consumption, and when perhaps a slight hæmorrhage has occurred without the manifestation of any definite local disease; as a *preventive* measure a residence for two or three seasons in a high mountain station is to be recommended.

2. In catarrhal forms of consumption, in the early stage, without much constitutional disturbance, the best results may be looked for. But cases with much fever from the commencement, and of nervous and excitable temperament, must not be sent to high altitudes.

3. Chronic inflammatory indurations and infiltration of limited portions of the lung, often the result of acute congestion and inflammation, are especially suitable; not so, however, if a considerable extent of

lung is the seat of tuberculous disease, or if, owing to the extent of lung involved and consequent changes in the sound lung, there is much difficulty of breathing.

4. Cases of chronic bronchial catarrh in young people; that is to say, those cases of tendency to repeated attacks of "cold on the chest," often left behind in children after whooping-cough, measles, and other maladies. But this does *not* apply to the chronic winter coughs of persons more or less advanced in life, or to cases where there is much *permanent* shortness of breath.

5. The results in the shape of thickenings and adhesions of former attacks of pleurisy, to which, too often the development of serious subsequent lung disease can be traced. The pulmonary gymnastics excited by treatment in high altitudes prove of great value in those cases.

6. Many cases of purely nervous asthma have been cured in these resorts.

7. Apart from cases of pulmonary disease, many other ailments, such as general loss of power, not dependent on organic diseases, cases of nervous exhaustion, overwork, retarded convalescence in otherwise vigorous constitutions, certain forms of dyspepsia and hypochondriasis, and other less strictly definable maladies, not seldom find restoration to health and strength from prolonged residence in the pure bracing air of these Alpine stations.

Next, as to the curative agencies at work in these resorts. This question is by no means an easy one to answer decisively. When we reflect that cases of consumption are arrested in their course and apparently cured, as they certainly have been, in such a climate, for instance, as that of Arcachon, on the coast of the Atlantic, and also in such an apparently utterly different climate as that of Davos, we are led to the conclusion that we must seek for some *special relation* between the individual to be cured and the particular climate that will suit him. And it is sometimes only by actual trial that such relation can be discovered.

Purity and stillness of atmosphere are two im-

portant, and may be the most important, conditions at work. Elevation in itself, as I have already said, may also be of some importance, but it cannot be an essential ; it brings with it other conditions, however, such as dryness and purity of air, which are of great consequence. The Tartar Steppes, where the Russian physicians send their consumptive patients, and where, we are told, they are cured, are sometimes below and not above the sea-level. It is not the low temperature alone that is the cause of immunity from phthisis in these mountain valleys, for in some of the coldest parts of Russia the mortality from phthisis is more than twenty per cent. of all deaths ; but the cold, in these places, is probably associated amongst the poorer peasantry with overcrowding and other insanitary conditions of life, to which the mortality from phthisis is doubtless due.

It used to be thought that an equable temperature was of great importance in the treatment of consumption ; and within certain limits, and if associated with certain other qualities, equability of temperature is an advantage in a climate ; but unless dryness of the air is associated with it, equability of temperature is not of so much value. Indeed a too equable temperature may lead to loss of tonic property, and so diminish nutritive activity. We find, for example, that in Ceylon, which has a remarkably equable climate, consumption is exceedingly common. On the other hand, at Quito in Ecuador, which is 10,000 feet above the sea, its immunity from phthisical disease is considered to be greatly due to its equable temperature ; the mean temperature for the year being 60 degrees Fahrenheit, and "in a large room with doors and windows open day and night the temperature varied between 57 degrees and 60 degrees only !" But it is obvious that the climate of Quito possesses also the other conditions dependent on great elevation. It has been suggested, and with much reason, that the immunity from phthisis observed in certain places and at certain elevations may perhaps be due to the fact that the inhabitants are all agricultural or

pastoral, and live out-of-door lives, and also to the relative scantiness of population.

But, as I pointed out some years ago, the chief curative agency at work in these elevated districts is probably the *antiseptic* quality of the air. It has been shown that there is an almost entire absence in these localities of those *organic particles* which play such an important part in promoting putrefaction. To this fact may be added the stimulating and tonic properties of the cold pure air, promoting the desire for muscular activity, as well as increasing the power for the same, by inducing increased activity in the general forces of nutrition. Another valuable condition is the rarefaction of the air, which necessitates greater activity of the respiratory organs. The respirations are necessarily more frequent and more profound; the air breathed is relatively richer in active oxygen than the air of the plains; a more complete aeration of the blood is secured; all the portions of the lungs which are capable of admitting air are called into full play and activity; the air-cells are more completely dilated; the functions of all the healthy portions of the lungs are roused and thoroughly engaged in the work of respiration. There is less stagnation of air in the lungs, and diffusion of the gases set free at the surface of the lungs is favoured. We are not then surprised to find that the chest expands considerably during residence in these resorts, and that portions of lung ordinarily little used in breathing (and these are the parts specially liable to be attacked in phthisis) become actively engaged, and so a compensatory activity in the sound parts makes up for the inactivity in parts which have become spoiled by disease. The increased rapidity in the circulating functions, the more complete penetration of all the tissues of the lung by the more active blood currents, may also promote repair and recovery from the damage inflicted by disease. These may not be all the influences at work in the restoration of health to the pulmonary invalids who pass their winters in these snow-covered regions, but I doubt not that they are the chief.

CHAPTER IV.

THE PYRENEES.

A SHORT STUDY OF SUMMER HEALTH RESORTS IN THE PYRENEES.

AN interesting route to the Pyrenees, and one not frequently followed, is that through Central France—through Auvergne and the Cantal to Toulouse. Clermont-Ferrand too is a good halting-place, whence the Puy de Dôme may be easily ascended and a general idea gained of the curious volcanic district around. At Arvant, a few miles south of Clermont-Ferrand, you leave the line of rail which goes to Nismes, and enter upon that which passes through the mountainous department of Cantal, and after passing Aurillac joins the Limoges and Toulouse line at Figeac. This is certainly one of the most extraordinary examples of railway engineering in Europe. The road is for a great part of the way cut out of the steep mountain-side ; now and again it runs through a deep cutting, spans a profound gorge by a lofty viaduct, or leaps with a single arch over a rushing mountain torrent. Tunnels succeed one another with astonishing frequency, and one of these, the tunnel of Lioran, is considerably more than a mile in length, and is, at its entrance, 3700 feet above the sea ! In passing through it one passes from the basin of the Loire to that of the Gironde. Ruins of ancient castles

are as numerous on the mountain-tops as they are on the banks of the Rhine ; curious basaltic rocks, some surrounded with numerous stages of prismatic columns, which the French liken to organ-pipes, are frequently passed. For a long time the conical summit of the Plomb du Cantal is seen as a prominent feature in this remarkable landscape, the railway actually skirting its base. Next to the Pic de Sancy, the Plomb du Cantal is the highest mountain in Central France ; it forms, as it were, the centre of a great number of volcanic chains, which spread out from it to the north, south, east, and west.

The railway after passing Aurillac still continues to run through mountain scenery, but scenery of a richer and more pastoral kind, and the turbulent mountain streams unite here into broad swift rivers. Within twenty miles of Toulouse the country becomes flat and uninteresting. It is somewhat remarkable that this interesting mountainous region of Central France should have hitherto attracted so little attention from English tourists.

From Toulouse to *Bagnères de Luchon*, in the Pyrenees, is a railway journey of about three hours, passing by Montrejeau, where there is usually a considerable delay. Soon after leaving Montrejeau the railway crosses the Garonne and enters the department of the Hautes Pyrénées.

The valley narrows, and in parts, from time to time, some lofty peaks appear in the distance. Just beyond the confluence of the Pique with the Garonne the railway again crosses the latter, leaves the valley of the Garonne to the left, and enters the beautiful valley of Luchon.

"It is a pleasure," says M. Taine, "to be ill at Luchon." Without going quite so far as this, one may certainly say that it must be a great pleasure to be cured in such a place as this. Luchon is decidedly a town of pleasure. Everything is arranged to make life look agreeable. I think it is Cherbuliez who says that life is feeble in the *mise en scène*, but here, at Luchon, art

and nature combine to produce a *mise en scène* which is quite irreproachable. It is as though the best bits of the Bois de Boulogne and the Boulevard des Italiens were thrown down in the midst of the grandest and fairest of mountain scenery. On each side rise immense mountains richly wooded to their very tops, and the valley is closed in by inaccessible rocky peaks, remarkable both for beauty of form and richness of colouring. Between the mountains the floor of the valley is literally an inhabited park or garden. Broad avenues of houses are partly concealed and shaded by double avenues of trees. The hotels are surrounded by gardens, illuminated at night by the electric light, for even that little bit of Paris life is not wanting. Dining-tables, with brilliantly white linen and glittering plate and glass, are laid out in the open air, and the promenaders and the diners walk and dine in presence of one another. Parisian waiters rush from table to table, and Spanish and Parisian beauties with Parisian toilettes adorn these tables. Magnificent hotels, comfortable clubs, excellent food and cooking, really fine music, in the most tastefully arranged of pleasure grounds in front of the bath establishment, gay flags and banners floating in the air—for it is rare that there is not some fête or other to excuse such a display; and on the particular occasion I speak of a glorious moonlight streaming over all—such is Luchon in fine weather and at its best. What it may be in bad weather and at its worst I cannot say. The houses around are all, or nearly all of them, elegant villas with tastefully arranged gardens. The horses which abound here—for everybody rides or drives apparently all day long—are quick and active, and the carriages are comfortable and elegant. Carriages and four are as common as butterflies; and the mounted guides (I doubt if any of them would condescend to walk) are got up in a smart costume, and have an offhand, dashing manner, equal to anything of the kind to be seen on the stage of the Opéra Comique.

An anonymous writer in "Blackwood" observes of

Luchon: "No other place in the world represents beauty and pleasure in the same degree. No valley is so delicious; nowhere is there such an accumulation of diversions; nowhere are there so many or such various mineral springs."

Luchon is admitted to be the queen of Pyrenean health resorts; but it is not a place for a poor person or a solitary person. If you come to Luchon you should take Iago's advice and "put money in your purse," for here, and indeed in most places in the Pyrenees, there is a thirst for the stranger's money as great as the most vengeful thirst for an enemy's blood. I heard a French lady remark that it was *un vol organisé*. The expression was a strong one, but possibly it was not altogether unjustifiable.

One ought not either to be solitary, for beautiful and numerous as are the excursions around Luchon, very few of them are adapted to the pedestrian. Horses or carriages and guides are nearly always necessary, and unless one belongs to a party of three or four the expense attending such excursions is very considerable. It must also be borne in mind that unlike Switzerland, where you often start at a considerable elevation, in the Pyrenees you start usually from the bottom of a hot valley, and have to toil uphill for many miles in the hottest part of the day, as nearly all the higher points of view are at a great distance from one's starting-point. The people, then, who come here for health ought to bring some of their family or friends with them, or bring introductions to families already here. It is remarked with astonishment by the physicians and hotel-keepers at Luchon that so few English come here, while many go to Aix; yet for a sulphur bath Luchon stands pre-eminent in all respects—for the abundance and variety of its springs, the quantity of water they afford, their composition and range of temperature. It is situated at an elevation of over 2000 feet above the sea, has a mild climate, and in the months of May, June, and September a fresh and somewhat bracing air. In July and August

it can be very hot, and it is during these months that it is crowded with Parisians and Spanish ; but even in August the mornings and evenings are often deliciously fresh. 9

The springs of Luchon, like those of most of the Pyrenean spas, are sulphur springs ; but it is claimed especially for Luchon that owing to the great number of its sources, the great quantity of water they yield, and the variations in their composition and temperature, it is possible here, by having recourse to one spring after another, and by blending different springs, or by the mere extent of choice, to vary and graduate and adapt the treatment to a great variety of cases and every kind of constitution and temperament.

The waters have the well-known smell and taste of sulphuretted hydrogen, but chemical analysis shows that there is but a small quantity of this gas in them. The chief amount of sulphur which they contain is in combination with sodium, as sodium sulphide. There is no doubt, however, that a considerable quantity of sulphuretted hydrogen is given off from the surface of the water in the baths, and the air over the large *piscines* contains quite one per cent. of this gas, so that breathing this air for an hour at a time, while swimming about in the water, may certainly have a decided therapeutic effect. The sulphur compounds in some of the springs readily undergo decomposition either on exposure to the air or when mixed with cold water, and they then become milky from the presence of precipitated sulphur. This also is thought a valuable property, especially in the treatment of some forms of skin disease. These waters have an alkaline reaction and a pleasant soft feeling to the skin. Besides other mineral constituents to which little importance is attached, they contain organic matter, which is found deposited, often in combination with sulphur, in the reservoirs and conduits of the water : this is often termed *barégine*. There exist also some iron springs in the environs of Luchon ; the principal one, and the best and pleasantest, on account of the carbonic-acid

it contains, is that at Sourrouille. Some persons drink it at table mixed with wine. The springs at Luchon are so numerous that it has been found convenient to classify them, according to their amount of sulphuration and their temperature, into eight groups. The hottest are the *Bayen* (68 degrees Centigrade, or 154 Fahrenheit), *Pré*, No. 1 (60 degrees Centigrade, or 140 Fahrenheit), *Grotte Supérieure* (58·4 degrees Centigrade, or 137 Fahrenheit), and *Reine* (57·6 degrees Centigrade, or 135 Fahrenheit). These have, of course, to be cooled or mixed with springs of lower temperature before they can be used for bathing purposes. But for the purpose of what is called *étuves sèches*, or dry vapour baths, and for the *salles d'inhalation*, their high temperature is altogether advantageous; the atmosphere in one of these *salles* can be raised to 46 degrees Centigrade, i.e. 117 degrees Fahrenheit, by allowing the vapour of the mineral water to spread freely through it. There are no less than twenty-six *buvettes*, or places where the waters of the different springs can be drunk, and these are supplied from four of the eight groups to which I have referred. Three of the *buvettes* are in the establishment itself; nineteen are in what is termed the Promenoir des Buvettes, a pleasant covered walk behind the building, and four are situated about a hundred yards from it under an exceedingly pretty rustic kiosk, which is called the Buvette du Pré, placed on an elevation in the park which commands a charming view. Here there are two *salles* appropriated to gargling, an important process at all these sulphur baths, and it has also a little *salon au premier*, where one can sit and enjoy the view. A number of bottles of syrups of different kinds surround the *buvettes*, and these are added by most persons to the waters to lessen their disagreeable taste. Patients often begin here, as elsewhere in France, by very small doses of the waters—a third or half a glass twice a-day—and this is very slowly and cautiously increased, for some digestions are readily disturbed by sulphur waters; they are

taken fasting before breakfast and during the hour or two which precede dinner. Drinking the water is, however, but a small part of the various curative processes which are made use of at Luchon. The Établissement Thermal is a handsome building, elaborately fitted up with all the appliances necessary for utilising the waters according to the most approved methods. It has well-appointed *salles d'inhalation* and *pulvérisation*, others for vapour baths, others for *humage*, i.e. for breathing through tubes the hot vapour given off by the springs. There are eleven different sets of baths in separate pavilions, supplied from different sources, and so arranged that the bather can take his bath with or without an atmosphere of vapour. A hundred and twenty of the baths are of marble, each furnished with a local douche. There is also a special department for the various sorts of douches, two small *piscines* for men and the other for women, and another large *piscine de natation*. Altogether it is one of the most complete bathing establishments in Europe. The great central hall of the Établissement, the *salle des pas perdus*, is constructed of white marble, the walls handsomely decorated with frescoes, and it is conveniently furnished with chairs and lounges and tables, supplied with a number of French and other newspapers. To this fine well-furnished hall the public are admitted free, and they can lounge there for hours reading the papers if they are so disposed.

In the next place, let us inquire what are the cases to which the treatment at Luchon is applicable. Chronic diseases of the skin, and of these especially chronic eczema, form perhaps the major part of the cases which come to Luchon for treatment. Other chronic skin diseases often improve considerably here, but they do not yield the same satisfactory result as cases of eczema. Chronic muscular rheumatism is often relieved here, as indeed at most thermal spas. Certain diseases of the glands, and especially of the bones, derive benefit often in a marked degree at Luchon. The waters of Luchon are also reported to

be, like those of Barèges, of great efficacy in the treatment of gunshot wounds. Several ambulances were established here after the Franco-German war, and excellent results are said to have been obtained from treatment by the sulphur waters. It is quite likely that they exercise a useful antiseptic action in such cases. Foreign bodies are stated to be extracted from the wounds by the influence of the baths. Cases of lead and mercurial poisoning are said to be cured here. Chronic affections of the throat, the ears, and the nose are largely and successfully treated by these waters, applied usually in the form of pulverisation and local douches. The source named the Pré is gaining a repute for the relief of chronic chest affections, as bronchitis, laryngitis, and all catarrhal conditions of the air passages. Some special maladies, to which I need not now allude further, are dealt with successfully at Luchon. Bagnères de Luchon then is a thermal station of much importance and attractiveness, and one which should not be overlooked by English doctors and English patients. No other European spa can compare with it in natural beauty, its elevation above the sea imparts a freshness to its atmosphere which renders the mornings and evenings always cool and agreeable; life there is as cheerful and pleasant as external things can make it; and it is certainly as likely to cure the ailments for which sulphur springs are appropriate as any other resort of this category.

Bagnères de Bigorre presents a great contrast to *Bagnères de Luchon*. As a permanently inhabited town it is larger, but as a thermal station it has much less to recommend it, and it has the appearance of being much less frequented. After Luchon, it presents quite the aspect of a rural retreat; though here also there is a little bit of Paris, but it is rather a small bit of the Palais Royal than the grand Boulevard. Indeed, the stalls of the Promenade des Coustous, with their bad cutlery, cheap jewellery, and lottery tables, scarcely merit a comparison with anything Parisian.

The bath establishment is insignificant as compared with that at Luchon, and need not be described. The waters are very feebly mineralised, of a comparative low temperature (32 degrees Centigrade), and do not contain sulphur—a very exceptional circumstance in the Pyrenean springs. They are used chiefly as baths, and are thought to be especially valuable in cases of hyperæsthesia, in excited and feeble nervous systems; in such cases they are reported to produce remarkable calming and sedative effects. They are, in consequence, much resorted to by delicate ladies with hysterical and other disturbed conditions of the nervous system. Daily immersions for some time in tepid water have no doubt, in many cases, a very soothing effect, and this influence is no doubt aided, and augmented by the calm unexciting life, the mild mountain climate, and the agreeable surrounding scenery. The town lies at an elevation of about 1800 feet above the sea, on the left bank of the Adour, in a charming situation near the opening of the valley of Campan, and overlooking the rich plain of Tarbes. It is not *in* the mountains, like the other Pyrenean spas, but is situated just where the lesser elevations begin to rise from the plains. It is amongst the outposts of the great central chain. Its pleasant climate and attractive scenery, and its accessibility by railway, make it a much-frequented resort of the permanent winter residents in Pau; there they escape the great summer heat of the latter place. Bagnères de Bigorre is especially rich in Roman remains. “The Romans,” says M. Taine, “a people as civilised and as bored as we are, came as we do to Bagnères. Rome has left her traces everywhere at Bagnères. The pleasantest of these relics of antiquity are the monuments which the patients who were cured there erected to the Nymphs, and the inscriptions upon which still exist. Reclining in their marble baths, they felt the healing virtue of the beneficent goddess spread through their limbs; their eyes half-closed, dozing in the soft embrace of the tepid spring, they heard the mysterious

source, falling drop by drop, in monotonous chant, from the bosom of its mother rock ; they saw the surface of the effused water glisten around them with its pale green ripples ; and there passed before them, like a vision, the strange look and the magic voice of the unknown divinity who visited the light in order to bring health to unhappy mortals."

Cauterets is perhaps at the present time the most popular of Pyrenean spas when regarded from a purely medical point of view. It is not a resort of fashion and pleasure like Luchon, but most of the visitors to Cauterets come with a serious purpose. There is a business-like look about everybody at Cauterets. The doctors rush about with the air of busy practitioners to whom "times is money," as they usually translate a maxim which they believe to be especially dear to Englishmen. The patients look graver than usual, and more bent than usual on carrying out with business-like accuracy the details of the cure. The bath men and women, the bath engineers, and all the *personnel* of the various bath establishments present the business aspect of the employés of a Birmingham factory. "*Nos eaux sont des eaux sérieuses,*" is the grave utterance of all the people interested in and engaged at Cauterets. The atmosphere, too, seemed a little heavy and business-like, and lacked that light and exhilarating tone which one felt in it at Luchon.

People who visit Cauterets, at any rate if they avail themselves of the railroad, must needs pass by Lourdes ; and they may encounter, as I did, on a fiercely hot day in August, a long train packed full of pilgrims returning from a visit to that shrine. To those who have only read of pilgrimages, the word probably calls up in the mind a picture not without some romantic colouring. They associate it with pious toil and faithful sacrifice, picturesque costumes, and venerable men and holy women ! It may have been so in the Middle Ages, but, alas ! the reality of the nineteenth century is something very different. A modern pilgrimage is more like a crowded Crystal

Palace train on a bank holiday: say a gathering of Foresters, and the likeness will be more complete, for each pilgrim, like the Forester, wears a badge. The train pulls up, and the pilgrims rush out, hot, dusty, and perspiring, in search of water. They are a vulgar and noisy crowd. They have all the badge of the *sacré cœur*. There are many priests among them, and quite without prejudice it may be said, that it would be difficult to find a less intelligent, more commonplace, and really common-looking class of men. Indeed, I looked for some intelligent, pleasant face amongst the crowd, and I looked in vain.

At Lourdes a short branch line runs off from that between Pau and Toulouse to Pierrefitte, at which place diligences meet the trains to convey passengers to Cauterets, or to St. Sauveur and Barèges. From Pierrefitte to Cauterets is a drive of about seven miles; and the road bifurcates almost immediately on leaving Pierrefitte, that to the left going to St. Sauveur, that to the right at once commencing the ascent to Cauterets. The road ascends, nearly the whole of the way, through a picturesque valley, dominated by lofty peaks, rugged and wild in parts. The road is here and there cut out of the side of the rock, at a dizzy height above the foaming torrent, the Gave of Cauterets, rushing along beneath. As we approach Cauterets the valley widens, and finally discloses the little town situated at the bottom of a narrow basin, surrounded nearly on all sides by lofty summits, frowning down from immense heights on the small town which lies crouched between the bases of the mountains. Several mountain valleys open into this basin, and lead to wild and picturesque excursions into the very heart of the Pyrenees; none of them are carriage roads except that leading to Pierrefitte. Cauterets is thus quite in the mountains, its elevation being a little over 3000 feet; its climate, however, is scarcely so bracing as might be expected in a place of this elevation. It is so much shut in on all sides by high mountains that it is capable of becoming very hot and close in certain

conditions of atmosphere. The mornings and evenings are, however, fresh and pleasant, especially before the end of June and after August. The basin of Cauterets is very prone, like other places of this medium elevation, to become somewhat suddenly filled with clouds, which may linger long, and give rather a dull and sad aspect to the little town. The climate is also rainy, and subject to sudden changes of temperature.

The reputation of Cauterets as a health resort is very ancient. M. Taine tells us that Julius Cæsar is said to have been restored to health by the spring named after him "César," and Abarca, king of Aragon, by the spring on that account named "du Roi." It was here that Marguerite de Navarre, sister of François I., a distinguished example of the race of "superior women," wrote the chief part of the "Heptaméron." She came here with "her court, her poets, her musicians," interested in all subjects, reading Greek, learning Hebrew, and delighting in theological discussion; at the same time, tender and simple: "Une imagination mesurée, un cœur de femme dévoué et inépuisable en dévouements, beaucoup de naturel, de clarté, d'aisance, l'art de conter et de sourire, la malice agréable et jamais méchante." Such is the attractive picture M. Taine gives of Marguerite de Navarre at Cauterets.

The waters of Cauterets are sulphur waters, like those of Luchon, but they are considered to be milder in their action and more sedative. They are efficacious, like those of Luchon, in diseases of the skin, in scrofulous affections, in chronic throat ailments, and especially in chronic diseases of the respiratory organs. I asked one of the leading physicians at Cauterets what they did with consumptive patients there. "We cure them," he replied, and he expressed great astonishment that we English physicians did not send more phthisical patients to be "cured" at Cauterets. But beyond this general statement I was not able to procure any definite demonstrative evidence of the cure of such cases at Cauterets. It is not easy, of course, to produce such evidence at the moment it

may be asked for, and credit must be given to the medical men who practise there for intelligence and honesty ; and their testimony is so strong in favour of the great amelioration that certain cases of consumption undergo at Cauterets, that it must, I think, take rank amongst the health resorts to which persons who are afflicted with chronic forms of consumption should be sent.

There are a great number of mineral springs at Cauterets, and several bath establishments, some of which, notably the César, are most elaborately fitted with every appliance that modern science has suggested in the use of mineral springs—douches of all kinds, inhalation and pulverisation chambers, besides baths of every description.

The source, however, which is especially valued for internal administration is *La Raillère*. It is really curious to encounter the long procession of drinkers coming away from the Raillère spring, which is situated at some little distance from the town ; each, young and old, sucking a stick of “sucre d’orge à l’eau de Cauterets.” It is impossible to explain satisfactorily how the small quantity (sometimes only four or five table-spoonfuls twice a-day) of this somewhat feebly mineralised sulphur spring can produce the remarkable curative effects that are claimed for it. But that many chronic catarrhal conditions are greatly benefited or cured there there seems no doubt. Moreover, the good results obtained at Cauterets are not confined to the human species. “Horses,” we are told, “from the studs of Tarbes and Pau, which are afflicted with chronic, bronchial, and stomach catarrh, etc. are sent to the springs at Cauterets, and are often cured there in a week.”

It is necessary to return from Cauterets to Pierrefitte, in order to reach the carriage road to St. Sauveur and Barège. *St. Sauveur* is *par excellence* the ladies’ baths of the Pyrenees. Like many other French spas it enjoyed for a time the personal patronage of the Emperor Napoleon III. and his Empress. They

erected a nice little church there of white marble, L'Église Saint Joseph, and a fine bridge, Le Pont Napoléon, in grateful acknowledgment of the good the baths of St. Sauveur had done them. The usual way of getting to St. Sauveur is from Pierrefitte. It is a drive of about eight miles from the latter place to the little town of Luz, and another mile from Luz to St. Sauveur. The first part of this drive through the gorge of Pierrefitte is very grand and striking; the road cut out of the side of the rock seems in places almost to hang over the torrent below. As it approaches Luz it enters a well-cultivated plain, and this charming little town is seen to stand at the junction of three villages, the one by which we approach it from Pierrefitte, one to the right leading to St. Sauveur, and one to the left leading to Barège.

The road from Pierrefitte to Luz is, even for the Pyrenees, unusually full of beggars, and every native one meets is not ashamed to beg "a trifle." Luz, which has been called "the most Pyrenean spot of the Pyrenees," is not only in the direct route to the baths of St. Sauveur and Barège, but it is also the spot from which tourists set out to visit the great show place of the Pyrenees, the Cirque de Gavarnie. A drive of three hours along a road of extraordinary wild and savage grandeur, in parts, leads to the mountain village of Gavarnie; but it is still a walk of two hours more before you reach the very depths of the magnificent Cirque. But I am specially concerned with health resorts, and as Gavarnie has not yet been promoted into a mountain-air cure (it is 4400 feet above the sea), I must return to Luz and say something about the adjacent health resorts of St. Sauveur and Barège. Some of those who come to bathe at St. Sauveur reside at Luz and drive daily to and from the baths, which are only a mile off. Luz is most pleasantly situated in the midst of meadows and slopes of the very greenest green, for they are irrigated by quite an endless number of little rippling mountain streams. The chief thing to be remarked at

Luz, however, is the "strange old battlemented church, more castle than shrine," built by the Templars six hundred years ago. A good road, planted with trees, connects Luz with St. Sauveur. St. Sauveur itself consists of a straight row of neat little houses, and at one end an inclosure of trees and gardens, called 'the Jardin Anglais. The springs are of comparatively feeble mineralisation; but, like the other Pyrenean spas, are characterised by containing sulphide of sodium, which gives them their characteristic odour. Their temperature is also rather low for baths, from 90 degrees to 94 degrees Fahrenheit. Being at an elevation of 2360 feet above the sea it has a mild mountain climate, and is rather subject to mists. It is considered to be a sedative situation, and to be especially adapted to females who suffer from maladies into which nervous irritability enters as an important element.

Barèges is also usually approached from Luz. It takes nearly an hour and a half to mount the four and a half miles of gradual and continuous ascent which leads from Luz to Barèges. In traversing this short distance we pass from a region of smiling pastoral beauty, of green pastures and wooded slopes, to one of dreary barrenness and desolation. The situation is certainly neither attractive nor picturesque. "The landscape," says M. Taine, "is hideous; it looks like a deserted quarry!" The little town consists of about a hundred poor-looking houses, and a row of wooden booths and stalls for the display of cheap cutlery, brilliant-coloured handkerchiefs, and the coarse articles found displayed for sale at similar places of resort. The elevation is about 4084 feet above the sea, and the climate is very variable—great heat alternating frequently with sharp cold, while cold mists from the surrounding mountains often collect over it, and it is tormented by violent winds. It is uninhabitable for five months in the year, during which time it is covered with fifteen feet of snow. "Il faut avoir beaucoup de santé pour y guerir," M. Taine remarks. But, not-

withstanding the dreariness of the situation, its baths enjoy a very great reputation for the cure of certain maladies; especially of wounds received in battle, of chronic rheumatism of the joints, of certain forms of scrofula, and of all kinds of diseases of the bones and joints, as well as some kinds of skin disease and some forms of paralysis. The sulphur springs are amongst the strongest in the Pyrenees, and are rich in that peculiar nitrogenous substance which has been termed *barégine*. There are twelve springs altogether. They are hot and vary in temperature from 88 degrees to 113 degrees Fahrenheit. The waters are drunk and used as baths and douches. The baths are either taken separately or in swimming baths. The invalids begin to arrive early in June, and in July and August the place is so crowded that patients sometimes have to wait their turns at Luz until they can be taken in. We are also told that in some seasons the number of bathers is so great that invalids have to leave their beds soon after midnight in order to take their turn at the baths; and the common baths are so crowded and badly arranged that the water and the air become foul and intolerable!

Owing to the repute which the baths have always preserved for the cure of injuries received in the field of battle, a military hospital has existed there since 1760. It has also a hospital (Hospice Saint-Eugénie) for the reception only of nuns and ecclesiastics, from the 15th of June to the 1st of September: these pay for their *pensions*. But from the 15th of May to the 15th of June and from the 1st of September to the 15th of October it receives poor patients, who are kept there at the expense of their *département*.

Eaux Bonnes is another Pyrenean health resort, frequented chiefly by persons suffering from affections of the throat and respiratory organs. "Chaque siècle," says M. Taine, "la médecine fait un progrès. Par exemple, au temps de François I. les Eaux Bonnes guérissaient les blessures: elles s'appelaient *eaux d'arquebusades*; on y envoya les soldats blessés à

Pavie. Aujourd'hui elles guérissent les maladies de gorge et de poitrine. Dans cent ans elles guériront, peut-être, autre chose. Les médicaments ont des modes comme les chapeaux. Un médecin célèbre disait un jour à ses élèves : ' Employez vite ce remède pendant qu'il guérit encore ! ' "

It is a pleasant carriage drive of four or five hours from Pau to Eaux Bonnes.* A little more than half-way, and just beyond the small village of Louvie-Juzon, one enters the Vallée d'Ossau, and in the distance, high above the other mountains, one sees the Pic du Midi d'Ossau, easily recognised by its curious summit of two unequal peaks. Within three or four miles of Eaux Bonnes the route bifurcates, that to the right going to Eaux Chaudes, and that to the left mounting to Eaux Bonnes. The village, about 2400 feet above the sea, is situated in a somewhat narrow gorge, stretching between the steep mountains which here bound on each side the Vallée d'Ossau. The chief part of the village consists of three rows of uniformly-built houses and hotels, forming three sides of a quadrangle, and inclosing a space planted with trees, and called the Jardin Anglais, where the inevitable band plays, and where the visitors walk, or sit and talk, or read, or work, as they may be disposed. Beyond and above the Jardin Anglais is the Établissement Thermal, and to the right, built in a conspicuous position on a terrace, is the handsome new church. Here also commences the remarkable and interesting carriage road constructed through the mountains which leads from Eaux Bonnes to Argelès.

A characteristic of Eaux Bonnes is the possession of a very fine promenade, which is called the Promenade Horizontale; it begins at the Casino—a building not yet completed—and is continued along the side of the mountain out of which it is cut,

* A railway is completed from Pau to Laruns, and will be opened this summer (1882); from Laruns to Eaux Bonnes is only a drive of twenty minutes.

always on the same level, parallel to, but at a considerable elevation above, the road leading from Eaux Bonnes to Eaux Chaudes. It is planted with trees, under the shade of which many seats are placed commanding beautiful views of the Vallée d'Ossau. When it is completed, according to the original design, it will extend for more than three miles until it joins the road to Eaux Chaudes.

Eaux Bonnes, with its excellent hotel accommodation, its pleasing site, and the numerous interesting excursions into the mountains which it commands, attracts every year a considerable number of the Parisian upper classes, who find a comparatively calm and unexciting and refreshing retreat there from the gay life of Paris. Its climate, too, is especially soothing; there is exceedingly little wind there, and I was assured by an excellent authority that the air is often so still that one may pass days without seeing a leaf stir on the trees. It is, however, subject, like most other mountain stations, to thunderstorms and heavy rains.

The quantity of water yielded by the springs at Eaux Bonnes is limited, so that it has never been the custom to use them, to any extent, as baths; the Grand Établissement however, contains a certain number of baths, as well as two rooms devoted to foot-baths, a chamber for gargling, another for throat douches and for *pulvérisation*. There is also another smaller Établissement d'Orteig, and a third Établissement de Bains de Santé et d'Hydrothérapie, in which the various processes of the "cold-water cure" are applied.

The principal spring, La Source Vieille, is a warm sulphur spring, in which the sulphur exists in combination with sodium, having a temperature of 33 degrees Centigrade, or about 92 degrees Fahrenheit. It is to the use of this spring that the good results obtained in so many cases of throat and chest disease are attributed.

To spend three weeks at a pleasant station like

Eaux Bonnes, and by so doing to get rid of one of those exceedingly troublesome throats which are common amongst public speakers, singers, and especially clergymen (hence often called "clergyman's sore throat"), one would think ought to prove an agreeable and popular remedy. French people seem to be of this opinion, and ecclesiastics and actors and singers abound at these sulphur springs, but one meets exceedingly few English there.

It is then for the cure of chronic affections of the throat—of the pharynx and larynx—that these waters are especially renowned, as well as for the cure of chronic bronchial catarrhs. It is also claimed for them—and the claim rests on no less an authority than that of the great physician Trousseau—that they are of unmistakable efficacy in cases of consumption; and this opinion is firmly maintained by those who have had many years of experience in treating such cases at Eaux Bonnes. It is, however, in the strictly local and limited manifestations of this malady, and not in those cases in which there is obvious general constitutional infection, or in which the disease is rapidly advancing, that the cure at Eaux Bonnes is indicated. There is any amount of medical testimony forthcoming as to the efficacy of the waters of Eaux Bonnes in fitly selected cases of consumption; while many of those chronic cases which by careful management continue to maintain a feeble but tolerable existence, by passing the winter in the south, etc. come year after year to pass some part of the summer season at Eaux Bonnes. There are many consumptive French patients, who, by the recommendation of their physicians, pass their winters on the Riviera, and their summers at Eaux Bonnes, or at one or other of the Pyrenean health resorts, and this arrangement seems to suit them well, and if their malady does not become cured, at any rate, its course is, for a time, arrested or retarded, and they obtain many years of agreeable existence which they could not insure in the north.

Eaux Chaudes is distant about six miles from *Eaux Bonnes* by a good carriage road; there is also a very interesting walk over the mountains between the two villages, commanding magnificent views of the grand surrounding mountain scenery. The carriage road for the first three miles is the same as that traversed in coming from Pau. It will be remembered that this road bifurcates within about three miles of *Eaux Bonnes*, the branch to the right going to *Eaux Chaudes*. When we reach this bifurcation we enter a narrow defile, sombre but picturesque, bounded on each side by enormous mountain walls, with a blue band of sky overhead. The road keeps to the left side of the gorge, often at a great height above the river—the Gave—which five hundred feet beneath roars and foams along its steep and stony bed.

We come somewhat suddenly upon the village of *Eaux Chaudes*, a simple village of a few houses and hotels, most charmingly situated in the very bosom of the mountains. As a health resort, as a bathing station, *Eaux Chaudes* seems as it were to have fallen asleep; it presents none of the life and activity and outward signs of material prosperity encountered in most of the other Pyrenean spas. Its *Établissement des Bains* is almost deserted; there are baths, but no bathers; there are springs, but no one comes to drink them. The bath attendants invite you imploringly to avail yourself of their services; the rows of empty unused glasses mutely appeal to you to "come and drink." And yet *Eaux Chaudes* is one of the most picturesque spots in the Western Pyrenees; but it is not in vogue at present. The tourist comes and admires the beauty of the site, drives to the village of *Gabas*, most grandly situated amidst wild mountain scenery, the magnificent *Pic du Midi* closing in the horizon, and then probably returns to his hotel at *Eaux Bonnes*. But the patients at *Eaux Chaudes* are few. When the *Route Internationale* between *Eaux Chaudes* and the

famous Spanish mountain health resort Panticosa is completed—and it has been recently determined that it shall be completed—passing by Gabas and the Col de Portalet, Eaux Chaudes may possibly recover some of its ancient reputation. The springs are sulphur springs, as elsewhere in the Pyrenees, but they are rather weaker and of lower temperature, notwithstanding the name of Eaux Chaudes.

Eaux Chaudes enjoyed at one time some reputation as a “ladies’ bath,” but St. Sauveur is now the resort *par excellence* of the French ladies.

It is common, after a “cure” at one of the Pyrenean health resorts, to consolidate the results by a visit for a few weeks to one of the adjacent watering-places on the coast of the Atlantic; and Biarritz or San Sebastian or St. Jean de Luz or Arcachon are all conveniently situated for that purpose.

The preceding is a brief sketch of a rapid personal survey, during an autumn vacation, of a few of the most important health resorts in the Pyrenees. It is somewhat remarkable that so few English health-seekers find their way to these thermal stations; yet they possess many attractions; most of them are in situations of great natural beauty, and surrounded by scenery possessing every kind of interest. The hotels are for the most part good, and the natives civil. But there are also certain drawbacks which weigh heavily on the English mind. Even in some of the largest and best hotels in the Pyrenees—and I would instance the large and handsome new hotel at Cauterets—there is an inattention to decency and cleanliness in some important domestic arrangements which would not be encountered in a third-class hotel in Switzerland. Then the Pyrenees are expensive, and if the natives are civil and polite they require to be paid handsomely for their civility. Moreover, you can scarcely move without a guide. There is hardly an indication anywhere, as in other districts visited much by tourists, by which a pedestrian can find his way; indeed, it seems pretty obvious that it is intended that

he should not find his way about alone ; so pedestrianism is not in vogue in the Pyrenees, horses or carriages and mounted guides being the order of the day. And no doubt in some of these hot valleys it is better to ride or drive than to attempt to walk. Then, again, you do not encounter in the Pyrenees any of those excellent hotels built in attractive spots at considerable elevations, such as exist in great numbers in Switzerland, and from which the higher mountains can be conveniently explored. But for invalids who come with a serious object, the life at such resorts as Luchon or Eaux Bonnes presents much that is attractive and agreeable.

CHAPTER V.

SOME FRENCH HEALTH RESORTS.

VICHY AND THE HEALTH RESORTS OF AUVERGNE (ROYAT,
MONT DORE, LA BOURBOULE, ETC.).

VICHY.

FRENCH health resorts are certainly not so popular with our countrymen as are German and Swiss ones, or, at any rate, they have not been so hitherto. Recently, however, attention has been much directed towards the Baths of Auvergne; and in France itself, within the last few years, an active and fruitful investigation has been in progress in connection with the very numerous and important mineral springs which are found in that remarkable and interesting district of Central France.

Vichy, one of the best-known spas in Europe and the most frequented of all the French spas, is, from its geographical position as well as the character of its waters, naturally associated with the neighbouring health resorts of Auvergne, and a brief review of the medical and social aspects of the place may serve as a fitting introduction to the study of those other stations which are rapidly growing in influence and popularity.

If we compare Homburg and Vichy, it is not a

little remarkable how many more English people are attracted to the former than to the latter place. Yet the waters of Vichy are, no doubt, much better suited to the treatment of many persons who go to Homburg than those of Homburg itself, and the same remark applies, but in a far more limited sense, to Carlsbad. Vichy is also quite as accessible as Homburg; it is reached in eight and a half hours from Paris. The hotels are excellent. The living is cheaper, and there are quite as many amusements. But Homburg is on the road to the "regular Swiss round," it is close to the somewhat cockneyfied Rhine, and, moreover, it is the custom with German physicians when a serious course of waters has been advised, to prescribe an "after-cure" among the Swiss mountains or in the Black Forest. The French physicians do not seem to have bethought themselves yet of after-cures. But why an after-cure should be necessary to the courses at Carlsbad and Homburg, and not to that of Vichy, may, perhaps, be a little puzzling to the uninformed mind. Vichy has the misfortune, and it is one which is apparently much less thought of by the French than the English, of being removed, and yet only just removed, from agreeable and picturesque scenery. A drive of three or four miles out of the town brings you into a country sub-alpine in character; the out-jutting spurs of the mountains of Forez, valleys clothed with rich green verdure, pine-clad hills, and rippling streams. But Vichy itself, it must be admitted, is little adorned by natural beauties; it is surrounded and shut in nearly on all sides by low-lying and uninteresting hills.

Much of the land on which the new part of Vichy has been built has been reclaimed from the right bank of the river Allier, along which it lies. The river itself is shallow and straggling, with flat sandy banks, from which only a distant view can be obtained of the mountain chains of Forez and Auvergne. What nature, however, has failed to do art has done much to supply. Napoleon III., who frequently visited

Vichy, like a grateful patient, did much for the place, to which he thought he owed much. He beautified and transformed it by causing handsome villas and public buildings to be erected, and by converting into a charming public pleasure-ground, beautifully laid out and planted with trees and shrubs, and furnished with flowers and fountains, all that part of Vichy lying between the town and the right bank of the river, and which is now known as the Parc Anglais.

The buildings devoted to the reception of visitors are of the most elaborate kind. The Établissement Thermal is furnished with every kind of appliance which "water doctors" have learnt to use—hot baths, cold baths, vapour baths, swimming baths, douches of every kind and every degree of force, direct, oblique, descending, ascending, with which your ailment can be attacked in turns; or if it should be a particularly obstinate one you can be introduced into an ingenious cage-like arrangement, where every form of douche can be made to play upon it at the same time. It is true, however, that few are bold enough to venture into this modern instrument of torture. Inhalations of carbonic-acid are also provided, but less benefit seems to have been obtained from this mode of treatment than was formerly anticipated from it. In asthma it is now rarely used, but it is still said to yield good results in some of those troublesome chronic catarrhal conditions of the mucous membranes of the nose and throat common in scrofulous constitutions.

The Casino is an elegant and luxurious building, providing every imaginable resource to prevent the visitors at Vichy from falling victims to that most terrible of maladies, *l'ennui*. Balls, concerts, and excellent operatic and dramatic performances, in which some of the most distinguished actors and singers in France frequently take part, are daily provided. But in the Casino at Vichy, as at other French health resorts, the gaming tables prove

unfortunately one of the most powerful attractions. Crowds nightly press round the *écarté* tables from the moment play begins until the Casino closes. The game is superintended by a sort of croupier, who makes and shuffles the cards, sees that the betting is equal on both sides before each game begins, and settles all disputes. Each game usually lasts but a few minutes, the losing player immediately yielding his place to another. In this way large sums of money rapidly change hands, and all the worst aspects of gambling are here represented.

Vichy and its immediate neighbourhood are extraordinarily rich in mineral springs. Wherever a shaft is sunk within a distance of six or seven miles in the basin surrounding the place, alkaline gaseous springs analogous to those of Vichy are certain to be found. Hence it is that many of the springs are private property and bear the names of their proprietors—such, for example, as the Source Lardy, the Source Larbaud, and others, each proprietor naturally claiming special virtues for his own spring. Now, although all these springs are of the same general character, they differ, many of them, from one another in obvious physical qualities. Some are cold, most are hot. Some contain a considerable quantity of free carbonic-acid, some contain very little, some are clear and sparkling, some are slightly cloudy, and at least one throws down a large amount of an organic deposit, which, from its resemblance to that deposited by the waters at Barège, is called *barègine*.

Moreover, some of the Vichy springs contain iron in appreciable quantity, while others do not, and this fact is made use of to classify these springs into two groups—the simple alkaline waters and the alkaline iron waters. It is to the possession of the former, however, that Vichy owes its great reputation. An appreciable odour and taste of rotten eggs in some of the springs leaves no doubt of their containing some sulphur compound yielding sulphuretted hydrogen, although no mention is made of this gas in

the analyses published. The predominating ingredient in all the sources of Vichy is bicarbonate of soda, and it is the chief one in the simple alkaline springs. Of these there are three which are commonly drunk. Two are hot springs—viz. the Grande Grille, situated in the Établissement des Bains itself, and having a temperature of 41 degrees Centigrade (106 degrees Fahrenheit), and L'Hôpital, situated in the town, rather more than a quarter of a mile from the Grande Grille, and having a temperature of 30·8 degrees Centigrade (87·5 degrees Fahrenheit); the third is a cold spring, the well-known Célestins, so called because of the existence of an ancient convent of that name close to the source. It is situated in a pretty and tastefully laid out inclosure, more than half a mile from L'Établissement, at the termination of the Parc Anglais, and near the river. The latter is a very pleasant water to drink, and has none of the disagreeable alkaline taste which an ordinary solution of bicarbonate of soda has. Its taste is, moreover, quite different from that of the other two springs, although their chemical composition is nearly identical. The difference of temperature and of relative proportions of free carbonic-acid in each may, to a certain extent, account for this. The spring called L'Hôpital contains by far the largest amount of organic matter, which causes a characteristic greenish deposit upon the sides of the basin into which it rises.

This probably gives an increased softness to the taste of this water, and may explain why it is that this spring is found so particularly applicable to cases of dyspepsia with much gastric irritability. Besides bicarbonate of soda, these sources contain bicarbonates of potash, magnesia, strontia, and lime, chloride of sodium, and small quantities of sulphate and phosphate of soda. It is important to remember that Vichy is probably the strongest soda spring known, containing as much as five grammes of bicarbonate of soda to a litre of water; this fact, together with the

relatively high temperature of some of its springs, gives to these waters a very high degree of importance medically. It is worth noticing that these springs contain also a minute quantity of arsenic, two to three milligrammes of arseniate of soda in a litre. We shall see how this ingredient increases in quantity and assumes great importance in some of the spas of Auvergne.

The springs of Vichy which contain the largest amount of iron are the Source Lardy and the Source Mesdames. The latter arises about two miles from Vichy and is conveyed to the town in pipes. Another spring, the Hauterive, which contains a notable amount of iron, and is richest of all in free carbonic-acid, arises at a distance of three miles from Vichy, and is, on both these accounts, the one chiefly used for bottling and exportation.

It need scarcely be pointed out that serious treatment by an active agent such as the mineral waters of Vichy demands imperatively constant and experienced medical counsel and supervision. Where there are so many sources having only slight shades of difference in quality and composition, the advantage of prolonged study and experience in determining the selection of one in preference to another is quite obvious. Then there is the question of the quantity of water suitable to each case, the question of baths and of the length of time during which such baths should be taken, the propriety of using douches and the kind of douche to be employed, the length of time the cure should last, these and many other minor questions must be left to authority and experience to answer.

Speaking generally, the source prescribed for stomach affections is L'Hôpital, that for hepatic disorders the Grande Grille, and that for gout and renal maladies the Célestins. But in each case the temperament, the constitution, and the habits of the individual have to be considered, as well as the nature of the malady. L'Hôpital is said to be less exciting than any of the other springs and best suited to feeble

and irritable stomachs. The Grande Grille is hotter, more stimulating, more rapidly digested, acts more quickly and energetically, and is especially indicated in cases of hepatic congestion and cases of gall-stone, with or without jaundice. It is to be preferred in lymphatic and debilitated constitutions, and is of especial value in the malarious cachexia often engendered among the French colonists in Africa, either alone or mixed with one of the ferruginous springs.

The Célestins, much preferred for its agreeable taste and sparkling quality, is said to be highly stimulating and exciting to the nervous system. The iron springs, the Source Lardy and the Source Mesdames, are especially serviceable in the cases of women and children after intermittent fevers, and are also well borne by dyspeptics who require iron. The quantity of water to be taken daily of necessity varies with the malady and the individual; it is no longer the fashion to prescribe the large quantities which were at one time consumed. Indeed, very remarkable results have been obtained with quite small doses of the thermal springs; and in cases of very feeble digestion only very small doses can at first be comfortably taken. The Vichy physicians consider the baths an important part of the cure. They are usually taken daily for an hour at a time at a temperature of 86 degrees to 93 degrees Fahrenheit, the mineral water being mixed with an equal quantity of fresh water. This is said to be an important precaution, the neglect of which may lead to sleeplessness, headache, congestion of the brain, and many febrile and nervous phenomena. The addition of bran to the bath is a method commonly adopted for diminishing its stimulating effect. The effect of the local application of the douche in cases of gall-stone, engorgement of the liver and spleen, as well as of affections of some other organs, is highly spoken of. The cases, then, to which the course of treatment at Vichy is appropriate are those of dyspepsia, when not due to organic, malignant disease, African dysenteries, the sequels of malarial fevers, congestion

of the liver and gall-stones, with the jaundice which frequently accompanies these conditions. Hepatic colic is a malady especially amenable to treatment by the thermal springs of Vichy.

Some years ago a violent dispute arose among the doctors of Vichy as to whether gout could or could not be advantageously treated there. The dispute grew so warm that it was referred to the Minister of Agriculture and Commerce, who referred it to the Academy of Medicine, and this body, in turn, refused to give any very definite decision on so delicate a question. The conclusions of one of the greatest medical authorities in Vichy and in France on this subject may be thus summarised: Seeing that gout is a particular error or vice of nutrition, and that the maintenance in their integrity of the natural phenomena of nutrition is the chief condition that can preserve from gout, and seeing that one of the most manifest effects of the waters of Vichy, properly administered, is the regulation of the digestive and eliminating functions, and to excite in them a special activity; it follows that the waters of Vichy tend to prevent gout or to correct the gouty constitution, by maintaining nutrition intact or by re-establishing it when disturbed. It is in this general way and not as a specific antidote that the waters of Vichy are valuable in gout.

While it was imagined that these waters acted as a kind of chemical antidote to gout, they were often administered in excessively large and injurious quantities; but now that a different and more rational view of their *modus operandi* is accepted, the use of small doses, the effects of which are carefully watched, is the order of the day. "Of all the diseases treated at Vichy," writes the eminent authority to which we have already alluded, "gout is the one whose treatment requires the greatest amount of precaution and watchfulness."

With respect to renal calculous affections so constantly treated with so much success at Vichy, it is only necessary to say that modern medicine no longer

sees a solvent action in these waters, nor can it longer resort to that hypothesis for an explanation of this success.

In cases of diabetes the course at Vichy has been frequently of the greatest advantage, but in these cases, as, indeed, in cases of gout, the Vichy waters must not be regarded in any sense as a specific remedy, but as producing their good effects through a general amelioration of the processes of nutrition and assimilation.

Vichy is also one of the many spas to which obese persons resort for the cure of obesity, and my next neighbour at the *table d'hôte* told me he "got rid of a great many pounds of superfluous weight in a very short time here."

Cases of anæmia, pure and simple, would scarcely come to Vichy for a cure; but cases of what are termed cachectic or symptomatic anæmia—i.e. anæmia the consequence of other disease, especially of disease of the organs of digestion and assimilation—are no doubt frequently benefited to a great extent by the alkaline-iron springs which are met with here. Improve the nutrition—improve, that is to say, the blood-making processes, and it needs no conjurer to tell us we shall make more and better blood.

The dietetic *régime* prescribed at Vichy is not a very severe one, nor is it in any way special. A fair and moderate amount of wholesome food and wine is all that is insisted upon. A breakfast at ten o'clock of two or three courses, of which one is usually of cooked fruit and vegetables and frequently carrots—for stewed carrots is a speciality of the breakfasts at Vichy—a little red wine and water, or tea or coffee for a beverage; a dinner at half-past five, which differs in no respect from the dinners met with at the *tables d'hôte* of any good French hotel—these two meals form the *pension* at the hotels. Early hours are the rule here. At six o'clock drinking and bathing commence seriously. Half an hour or an hour of absolute repose after the bath is *de rigueur*. After the ten o'clock

breakfast, a lounge in the open air, or a very gentle promenade, or a ride on a donkey passes the time till two or three in the afternoon, when water-drinking begins again, and those bathe who do not like the early morning hour. A sort of full-dress promenade in the park also begins about half-past two, and lasts during the performance of the band. On Thursdays the children are especially thought of. A cordon is drawn round a circle immediately surrounding the orchestra. There, separated from the rest of the promenaders, the children of the visitors, mostly prettily dressed, assemble in considerable numbers, and dance *en rond*. In the time of the late Emperor, a time looked back upon with regret by many of the inhabitants of Vichy, liveried lackeys handed light refreshments to the children after or during the dance. Dinner beginning at the early hour of half-past five, is over in time to leave the visitors free either to lounge or promenade again in the park, or visit the Casino and take part in the amusements there provided.

There are many interesting excursions to be made from Vichy in carriage or on horseback, but they are most of them at some distance, and those who are seriously bent on the cure there are probably but little interested in anything else.

The climate of Vichy is temperate and is said to be just like that of Paris; owing, however, to the vicinity of the mountains of Auvergne, thunderstorms are frequent and persistent, and in autumn thick fogs are common in the mornings.

The natives of the district are a feeble-looking race, having for the most part a poor physique and an unattractive appearance. Garden flowers, and especially roses, are very abundant, and it is a feature of life at Vichy to find the doors of the hotels surrounded by young peasant girls, with enormous bouquets of roses and carnations, which they sell for a franc or a franc and a half apiece.

Only two miles from Vichy is another town,

Cusset, with important mineral springs, which is striving to make itself a name side by side with its formidable neighbour. It has this advantage over Vichy, that it is two miles nearer to such picturesque scenery as the neighbourhood offers, and it possesses a spring, the Sainte Marie, much richer in iron than any of those at Vichy. In other respects the waters are of the same composition, but the waters of Cusset are cold, and anyone familiar with watering places is aware how very important an element of prosperity to such a place is the possession of a thermal source. Vichy, then, has nothing to fear from the concurrence of Cusset, but it seems not improbable that the existence of the stronger iron water in the latter place and its relative nearness to pretty scenery may attract visitors to whom the Vichy course is not so well adapted.

ROYAT LES BAINS.

The volcanic district of Auvergne is, as might be expected, enormously rich in thermal springs, many of which rise in mountain regions, where picturesque scenery and fine bracing air contribute no unimportant addition to the effects of these mineral sources. It is said that there are no less than five hundred distinct mineralised springs in Auvergne, while the department of Puy de Dôme alone contains over two hundred. Most of these are but little known even in France, and, of course, still fewer are known in England. Many of them are in out-of-the-way mountain districts, at a considerable distance from railways, where the public conveyances are of the worst description and the hotel accommodation of the most primitive kind. Who has heard in England of the thermal stations of St. Nectaire, Médague, Aigueperse, Chaudesaigues, Châteauneuf, or even of Châtelguyon? Yet these appear as important sources in a map of the principal thermal stations of Auvergne which lies before me. Of the better known and more frequented sources, Mont Dore, La Bourboule, and Royat, the former is, perhaps, the only bath that is at all well known in England.

So far as I am able to judge, Royat seems destined to attain a popularity and an importance quite equal to that of Mont Dore or La Bourboule; while its much greater accessibility and milder climate cannot fail to make it even more popular with a considerable proportion of invalids.

It is only within the last few years that Royat has

become at all known to the medical world in England as a health resort. Royat has been described as "in a beautiful situation not far from Clermont-Ferrand, in Puy de Dôme, 1380 feet above the sea-level, with an agreeable refreshing climate, and possessing several springs which in their constitution resemble those of Ems. The climate of Royat is during the months of July and August decidedly preferable to that of Ems." Since this was written the different mineral sources at Royat have been submitted to closer investigation and careful analysis, the place itself has undergone a rapid process of development, and arrangements for the fitting accommodation of visitors and invalids have been greatly extended; while it is easy to discern that the destinies of Royat are, fortunately, in the hands of able and intelligent persons, who intend to spare no effort to make it a health resort of European reputation. In this respect it contrasts favourably with its neighbour, Mont Dore, where visitors are compelled to submit to accommodation which is not only primitive—that would be a comparatively small matter—but often offensive and dirty.

In the first place, I will say a few words as to the composition and uses of the waters at Royat. It is claimed for them that they are rich in lithia, and virtues are claimed for lithia in the treatment of gout which, it must be admitted, many of the highest authorities regard as wholly hypothetical. It is necessary to keep this fact in mind, as it has been somewhat hastily maintained that lithia is the acknowledged remedy for gout; and it would be in the highest degree unsatisfactory if this statement were allowed to pass without question. If, however, it should be established by experience that very minute doses of lithia are of service in the treatment of gout, then the Royat waters may certainly claim to be efficacious in the treatment of that malady. The Source Eugénie contains fifty-nine milligrammes of bicarbonate of lithia in a litre—that is to say, about a third of a grain in sixteen ounces. Arsenic in very minute quantity is also found in the

Royat waters. In the St. Victor spring, according to the latest analysis, two milligrammes of arseniate of iron per litre is stated to exist.

Much importance is attached to this fact at Royat, although at Vichy no importance appears to be attached to the circumstance that arseniate of soda is found in all the springs there to the amount of from two to three milligrammes per litre. Indeed, it has been doubted by very high authorities on mineral waters whether these very minute quantities of arsenic have any appreciable effect. If it should be proved by experience that they have, this doubt also will be removed. To find arsenic in a mineral water has been looked upon lately as almost as good as finding gold in a mine. Apart, however, from the presence of lithia and arsenic in the waters of Royat, they contain other important constituents in considerable quantity. The alkaline bicarbonates predominate, as in most of the mineral springs of this district, those of soda, lime, and magnesia chiefly, and to these must be added chloride of sodium. The Source Eugénie is the most richly mineralised, and contains more than five grammes of solids in each litre—i.e. rather less than forty grains in sixteen ounces. The Sources St. Mart and St. Victor contain nearly as much; the Source César is but very feebly mineralised, and as it contains a considerable amount of free carbonic-acid, it is the best suited for use as an ordinary drinking water. It is by no means unimportant to bear in mind that three of these springs—viz. the Eugénie, the St. Victor, and the César—contain an appreciable quantity of bicarbonate of iron. There are thus four principal springs at Royat: Eugénie, St. Victor, St. Mart, and César. These are all thermal springs; the Eugénie is the hottest, and has a temperature of 35·5 degrees Centigrade (96 degrees Fahrenheit); the St. Victor the coolest—its temperature is 20 degrees Centigrade (68 degrees Fahrenheit).

At Royat, as in most other large spas in France, the waters are utilised in every possible manner; the

well-appointed Établissement provides douches of all kinds. To each bath there is a douche. There are *salles d'aspiration*, in which one sits, fitly attired, and breathes the vapour driven into the chamber from the hot springs themselves, and, after being steamed in this fashion for half an hour, the patient is hurried off to his hotel in a sort of sedan-chair and ordered to repose for an hour. There are also well-appointed *salles de pulvérisation*, in which jets of water are pulverised by being driven with great force against metallic discs, or the water is driven into spray by means of steam. These jets of spray and pulverised water are inhaled, and are the chief treatment employed in affections of the throat and nose. Baths and douches of carbonic-acid gas are also provided. Royat also possesses a fine *pièce*, or swimming bath, one of the largest of its kind. This is furnished with a gymnastic apparatus and is very popular with the French ladies, where they delight to disport themselves for an hour or more in the morning. The water is very buoyant, but it has not an agreeable aspect, being of a dirty, greenish, and clouded appearance. It makes the hair sticky and matted unless it is carefully washed with fresh water after the bath. There is a *professeur de natation* attached to the Établissement.

A hydrotherapic establishment, in which all the processes of the ordinary water-cure can be carried out, has recently been added to the other curative resources of Royat. The chief *buvette*, or drinking fountain—that of the Eugénie Source—is situated in the tastefully-arranged park, and the water is ladled out from the bubbling source itself, and handed to the numerous claimants by female attendants. Before breakfast in the morning—the serious *déjeuner* is at eleven o'clock—and again between three and four in the afternoon are the times appropriated to drinking the waters, the dinner hour being six. A good band, often that of the artillery regiments in Clermont, plays during the afternoon drinking hour, when the park presents quite a gay and animated appearance.

It is somewhat curious to observe here how completely the system of ordering large quantities of water to be drunk has given place to the other extreme of ordering very small quantities. Half-a-glass twice a-day must convey a dose of lithium or arsenic small enough to gratify the most homœopathic mind. I saw a young lady, attached in an official capacity to the Établissement, who had, in an unguarded moment, been quenching her thirst at one of the mineral springs, and had drunk it as if it were pure water. The consequences were by no means agreeable. To use her own expression, she felt as though she could "*ni la garder, ni la rendre!*"—a sufficiently embarrassing state.

The next question with regard to Royat is—What are these waters good for? what diseases do they pretend to cure there? The two words most frequently on the lips of the physicians of the place are *arthritisme* and *lymphatisme*. In this we see one of the characteristic tendencies of the French mind—i.e. a tendency to rapid classification and generalisation. It is unquestionably a defect and a serious one. The English mind—I am thinking, of course, of the scientific mind—generalises slowly and with great caution. It results from this that a French physician will be dogmatic and precise when to an English one dogmatism seems dangerous and precision impossible. It must, however, be admitted that our term "gout," in its modern use, is as unscientific a generalisation as *arthritisme*; but we use the word in a conventional and popular, not a scientific sense. After all, it merely amounts to this, that certain maladies, if they arise in a constitution which has a tendency to develop gouty and rheumatic joint affections, are cured by the waters of Royat. So also certain maladies arising in constitutions which have a tendency to glandular enlargements are also cured here.

The form of gout most suitable to treatment at Royat is that which is termed atonic, or gout associated with anæmia. The plethoric form of gout

requires a far more active water, such as that of Carlsbad. The arsenic and the iron combined in the Royat waters render them decidedly tonic. Gouty dyspepsia is well suited to treatment here. I am assured also that certain forms of skin disease—indeed, nearly all forms having direct relation to the gouty constitution—are very greatly benefited by this course.

For example, what the French call *couperose*—in plain English, the gouty “red nose”—I am told, disappears under treatment here. Should this statement be corroborated by further experience, the valley of Royat will, doubtless, in course of time, bloom with red noses. One can imagine opposite rows of such sufferers seated at a *table d’hôte* earnestly regarding with delightful anticipation the gradually diminishing shades of colour of the noses of their opposite neighbours. Acne, too, that most intractable and disfiguring pimply eruption on the face, is, I am informed, very amenable to the Royat waters. Gouty eczema—i.e. patches of eczema, limited and localised—belong also especially to the list of ailments cured here. Diabetes and certain forms of Bright’s disease, some of the local medical men maintain, do well here.

Anæmia and chlorosis, and other diseases of women similar to those treated at Ems, are also treated at Royat. Chronic rheumatism—that opprobrium of the medical art—is, in some instances, greatly relieved by these waters. But it is also in some forms of diseases of the chest that the waters of Royat have been lately maintained to be particularly efficacious, especially when inhaled in the form of vapour. Chronic bronchial catarrhs, catarrhal asthmas, and even cases of early consumption, are sent in considerable numbers to Royat for treatment; and its climate is considered very suitable to such conditions. It is, at any rate, premature to hazard such confident opinions as one meets with in some quarters on this point; and especially is this the case

with regard to consumptive patients, when one considers, too, the constant errors in diagnosis which occur in connection with what is called the early stage of consumption. This leads me to say a few words on the climate and situation of Royat. Royat is only a quarter of an hour's drive from Clermont-Ferrand, an important town of Central France, on the direct line of railway from Paris to Nîmes, and reached by express train from Paris in between eight and nine hours. As you approach Clermont you observe that it is built on rising ground at the border of a large semicircular basin, surrounded on all sides except towards the east by those remarkable volcanic dome-shaped mountains, "Les Monts Dômes," or "Les Puys" of Auvergne. In the centre of these rises the Puy-de-Dôme, considerably the highest of these "Puys," and on the summit of which, in clear weather, the meteorological observatory erected there can be seen, as well as the magnificent ruins of a great Roman temple to Mercury, which were discovered during the excavations rendered necessary for the construction of the observatory. Royat is situated in a picturesque valley, which runs up to a sort of ridge, which bounds a richly cultivated plateau stretching to the eastern base of the Puy-de-Dôme. It is inclosed by mountains on all sides except towards the east, where it looks down on Clermont, and thence over the whole of the rich plain of the Limagne and on to the mountains of Forez, which limit the eastern horizon.

Its climate depends partly on its adjacency to the great central mountain chains of Auvergne, the Monts Dômes and the Monts Dore, partly on the porous volcanic soil, and partly on its own particular situation. To the first it owes its sudden storms of wind and thunder and rain, and its sudden transitions of temperature—the characteristics, in short, of a mountain climate of moderate elevation. To its volcanic soil it owes the clouds of black and reddish dust which are blown about in eddies by the sudden gusts of wind, as

well as the dryness of its roads and also the dryness of its atmosphere, this dryness of atmosphere being a most important climatic condition, counteracting the ill effects of the storms of wind and rain. Then there is the peculiar situation of Royat itself. Lying as it does in the floor of a somewhat narrow valley, surrounded on all sides by mountains, and open only to the east, running, moreover, in a direction exactly east and west, and facing the east, it is particularly exposed to the direct heat of the sun. From the moment the sun rises in the east above the mountains of Forez until it sets in the west behind the gigantic mass of the Puy-de-Dôme, Royat lies exposed to its rays ; and it is therefore exceedingly difficult to find any kind of shady walks in the immediate vicinity of Royat when the sun is up and the sky is cloudless. Generally, however, when the sun goes down, the cooler upper strata of air rush down from the higher plateaux into the valley, and thus you get cool refreshing currents of air playing through the valley on the evenings of even some of the hottest days in summer.

✓ The invalids and visitors at Royat are well provided with amusements ; the presence of two regiments of artillery at Clermont, with a permanent band, provides very good orchestral music. At the Casino there is a concert or ball or dramatic performance every night, and some of the eminent singers who are following the course of treatment at Royat often take part in these entertainments. There are reading and billiard-rooms, and the usual *écarté* tables surrounded by a crowd of gamblers. Good riding horses, donkeys, and carriages are supplied in profusion. The excursions are numerous, varied, and interesting ; for no more remarkable country to the geologist, the naturalist, and the archæologist can be found than this great mountainous district of extinct volcanoes, old mediæval towns, historic churches, and Roman and even earlier remains. Some of these excursions, however, are long and fatiguing, and the real invalids will probably do better to remain in the park or in the gardens or on

the terraces of their hotels. The ascent of the Puy-de-Dôme is easily made from Royat; carriages of a certain kind can be taken quite to the top. A good walker requires about three hours to walk from Royat to the summit. The view from the summit is very remarkable. The surface of the country that one looks down upon seems to have boiled up at some remote period, like the contents of a bubbling cauldron which has been suddenly cooled and consolidated in the very act of boiling. The archæologist will find a source of the greatest possible interest in examining the very remarkable and extensive remains of a Roman temple to Mercury, much of which is in excellent preservation, erected here close to the very top of the mountain, more than 4700 feet above the sea-level. There is very little that is interesting in the town of Royat itself. Clermont-Ferrand, however, possesses an excellent geological museum, some curious historical monuments, and a very fine specimen of the Roman-Auvergnat school of architecture, the church of Notre Dame-du-Port, built about 870; it also possesses a celebrated incrusting spring, that of St. Allyre.

^ The natives of Auvergne, especially those who inhabit the plains and lower valleys, are a singularly uninteresting race. They are industrious and thrifty; but they are physically unattractive and particularly dirty, and *goître* is very common. They no doubt possess the virtue of economy, if not the vice of avarice, but there is an entire absence in their villages of picturesque and poetic rusticity. The plain of the Limagne, one of the most fertile districts in France, and one of the most highly cultivated, is almost entirely cut up into small holdings, in the possession of the peasantry. An Auvergnat peasant will toil night and day himself, and make his family toil till he has amassed, say, a thousand francs. He then buys a piece of land for two thousand francs, and urges his family to renewed exertions to pay off the debt. So he goes on adding piece to piece, till

he not unfrequently becomes the possessor of a portion of land of considerable value. Then his great delight is to educate one of his family to be a priest, or an *avocat*, or a doctor. Much interesting information about the "Peasant Proprietors of the Limagne" will be found in an article with this title, by Mr. Barham Zincke, in one of the numbers of the "Fortnightly Review" of 1878.

Of the dirtiness of the Auvergnat himself, as well as of his home, many curious stories are told. We were ourselves witnesses of a curious illustration. Walking one Sunday morning to the old church at Royat, where Signor Cotogni was going to sing, we were suddenly alarmed by a peasant rushing in an excited manner apparently towards a lady of our party and flourishing a whip high in the air. We looked around and found his excitement was produced by an attempt, on the part of a pig, to get out of the window of an upper storey and take the air on the window-sill. The pig certainly was in imminent danger of falling from a considerable height into the street; but a young and dirty damsel appeared at the window, attracted by the noise, seized the pig by the ears, and induced him to return to the society of the family circle, with which he was evidently a little bored. The only damage done was the smashing of a flower-pot. A medical gentleman, a native of the district, told me that upon an Auvergnat peasant being ordered a bath, he asked his medical man in some bewilderment what he was to do. His doctor asked him if he had never in his life taken a bath? "Mais, monsieur," he replied, "je n'ai jamais été malade."

On another occasion a peasant was told to go into a bath-room at one of the bathing-places and take a bath. After a short time the bath attendant heard most frightful groanings and gurglings proceeding from the apartment, and on going in to see what was the matter, found the patient on his knees before the bath making violent efforts to swallow the bath, but declaring piteously that he never should be

able "to swallow all that!" Notwithstanding, then, the material prosperity of the peasants in this district, their villages form a great contrast with the cheerful picturesque villages of Switzerland, and it is impossible for anyone with any delicacy to travel through Auvergne as he would through Switzerland, trusting to find a decent lodging in a country inn.

MONT DORE LES BAINS.

At an elevation of 3400 feet above the sea, is the highest mountain health resort in Central France, and certainly the most frequented. It is necessary to go as far as the Pyrenees to find a bath at an equal altitude; Cauterets is not so high by two or three hundred feet; but Barèges is higher, being 4000 feet above the sea. The waters of Mont Dore are spoken of by the resident physicians, with much solemnity, as *des eaux sérieuses*, but we shall see presently that their seriousness must be in their mode of application, as it certainly is not in their chemical composition. Mont Dore is fifteen hours from Paris, taking rail and road together. It is usually approached from Clermont-Ferrand, from which it is distant, by a mountain road, about twenty-eight miles. Diligences leave Clermont-Ferrand at seven and eight a.m., and again in the evening for Mont Dore, and are about six or seven hours on the road. There are several routes, but the public conveyances naturally take the shortest. You leave Clermont by a level road, bordered by avenues of lofty trees, and soon begin to ascend gently through orchards and richly-cultivated hills, covered for the most part with vines. Les Puys, as the volcanic mountains here are termed, rise on all sides, covered with green turf up to their dome-like summits and with chestnut trees at their bases. The summit which chiefly attracts attention for some time after leaving Clermont is the one which is called Mont Rognon. It is rather less than 2000 feet high, but it is

distinguished from the adjacent Puys by having the ruins of an old castle on its top, visible for many miles around. Like its neighbours, it appears to have been formed by volcanic action. The road also skirts the celebrated mountain plateau of Gergovia, the site of an ancient Gallic city; it was on its slopes that the renowned Vercingetorix defeated the invading legions of Julius Cæsar. It is related that Augustus Cæsar, many years afterwards, caused the town to be destroyed, and forced its inhabitants to migrate, thinking thereby to destroy the memory of this defeat of Cæsar's army. Interesting remains of this ancient Gallo-Roman city have been excavated here in great abundance. The road makes many long, sweeping zigzags, and finally reaches an extensive plateau, stretching from the bases of the *Monts Dôme* to those of the *Monts Dore*. You now see the commanding mass of the *Puy de Dôme* and the adjacent Puys from the other side to that from which you viewed them at *Clermont*. There is little of interest in the road until you begin to mount a low pass which leads from this plateau into the valley of *Mont Dore*. At the summit of the pass, about 4000 feet above the sea, are two very remarkable isolated rocks, *La Roche Sanadoire* and *La Roche Tuilière*. These stand up like the pillars of a natural gateway, closing the valley. A magnificent view over the rich plains and the extinct volcanoes of *Auvergne* spreads out before one, framed, as it were, into a compact picture by these lofty and gigantic rocks.

It is a singularly striking and beautiful landscape. A little distance from these rocks the road passes by a small lake, the *Lac de Guéry*, well furnished with fish, and incorrectly stated in some books to occupy the crater of an extinct volcano. The road now descends rapidly, by numerous zigzags, through richly-wooded mountain slopes, till it reaches the little town of *Mont Dore*. *Mont Dore* lies, with its houses closely packed together, in the bed of a valley, surrounded nearly on all sides by high mountains,

some reaching to nearly 3000 feet above it. When you are actually in Mont Dore you seem to be shut in on all sides, but this is not really the case. The valley pursues a somewhat sinuous direction. Shut in and terminated towards the south by the steep sides of the Pic de Sancy and the adjacent mountains, the valley runs from south to north, with a little inclination westward, and a little beyond the town of Mont Dore it makes a somewhat sudden bend to the north-west, and opens out more and more as it descends, and reaches in four or five miles the neighbouring bath-station, La Bourboule. The surrounding country is very beautiful, abounding in richly-wooded slopes, striking mountain forms, and pretty though small cascades, with many grand views from easily-attained elevations. The Pic de Sancy, over 6000 feet above the sea, the highest mountain of Central France, is easily reached from Mont Dore in a walk of about three hours. It can be reached in much less time on horseback, and horses can be taken to within ten minutes of the summit. A very extensive view is thence obtained. In one direction, somewhat south-east, the peaks of the Cantal chain appear directly in front of one, and in the opposite direction all the Puys of the Monts Dôme stand boldly up from the plains of Auvergne. Several small lakes come into view, and especially remarkable is Lac Pavin, surrounded by a perfectly circular deep rim, and obviously occupying the crater of an extinct volcano. The imposing group of ruins of the Château of Murols and the neighbouring lake, Chambon, so finely described by Madame George Sand in "*Le Marquis de Villemer*," form striking and easily-recognised features in the landscape. Indeed, Mont Dore forms the centre of numerous most agreeable and interesting excursions of every kind of length; its streams and cascades, however, are poor compared with those of Switzerland and other mountainous countries. Horses and donkeys are good and abundant, and cavalcading for two or three

hours daily seems to form an essential part of the cure here. Groups of persons on horseback and children on donkeys are constantly encountered in all the roads round Mont Dore. The town itself has an ancient aspect; in its centre there is a small and somewhat sombre square, which is termed La Place des Thermes, two sides of which are formed by buildings belonging to the bath establishment, and the rest consisting of hotels and divers kinds of shops.

The square itself is crowded, especially in the morning, with various species of vehicles and numerous horses and donkeys and their owners, who eagerly urge visitors to test the merits of their respective steeds. Young maidens and old women accost you, regardless of an appearance indicating perfect health, and beg you to allow them to provide you with a *costume de bain*, and if you reply that you are not here *pour suivre le traitement*, they look upon you with astonishment, not unmingled with contempt. Indeed, there are obvious evidences at Mont Dore of a permanent struggle between the visitors and the natives. The native—the grasping, greedy, dirty Auvergnat—looks upon the invalid visitor as being especially sent for his, the native's, benefit; the visitor, on the contrary, not unnaturally, looks upon the native as a person intended to provide for his, the visitor's, comfort and accommodation. It is therefore exceedingly difficult to establish an *entente cordiale* between persons who look upon things from such absolutely opposite points of view. It is only thus that this remarkable fact can be accounted for—that, after many years of renown and prosperity, Mont Dore does not possess a hotel really suited, not only for the reception of the delicately natured invalid, but even for the accommodation of the better class of tourist. With the exception of the food, which, at least in one of the hotels (Chabaury Aîné), is certainly very good, the domestic arrangements in all the hotels here call for considerable improvement. It would seem, however, to be a deeply-rooted prin-

ciple with the Auvergnat to give you the worst possible accommodation at the highest possible price. On the top of the Rigi, near the top of Monte Generoso, in the comparatively remote valley of the Engadine, and in scores of other mountain health resorts in Switzerland and Germany, excellent hotels, with admirable accommodation, are provided ; but here, within thirty miles of an important town, in the centre of a richly cultivated and prosperous country, within fifteen hours of Paris, the accommodation provided for strangers is little better than that of a country *auberge*. Such simple things as really good bread and butter it seems impossible to obtain either at Mont Dore, Royat, or any place in Auvergne. They do not know how to make either, and are probably indisposed to learn ; but a journeyman baker and a dairymaid from Paris could soon teach them. Cases of decided overreaching on the part of hotel-keepers occasionally occur here, and quite recently at the Grand Hotel an English family were charged two hundred francs as *indemnité*, because they did not like the hotel and wished to change it for another. The *Établissements des Bains* consist of two large buildings, occupying the two sides of the square I have spoken of. They are substantial, but heavy and rather dismal edifices, and the internal arrangements lack much of the elegance which may be found in other large bath establishments. One of these buildings is devoted to the baths and douches, including foot baths, which was at one time a speciality of this place, and the *piscines* ; it contains also a set of baths on the ground-floor for the poor and indigent. On the upper-floor (in the absence of a casino) the concert-room, reading-room, gambling-room, etc. are placed. The second building is termed "L'Établissement des Vapeurs," and is devoted to the *salles de pulvérisation* and the *salles d'aspiration*. These are very extensive. It is a curious sight to enter one of these *salles*, filled with hot, dense, vaporous mist, through which you dimly discern the forms of the patients, some sitting,

some standing, some walking, some reading, some talking. Here every morning they are shut up for half an hour or longer to inhale this hot mist. One comes out of it, gasping for breath, into the open air. This part of the cure is no doubt sufficiently serious. Great care is taken that a patient who is being submitted to this treatment does not take cold. When he comes out of this vapour bath he is conveyed rapidly in a sedan-chair to his hotel, and is expected to return to his bed, which is heated by a *chauffeur*, and remain there for an hour. Thus it happens that, from the early hour of four a.m. at Mont Dore, the stairs and passages of the hotel are made "hideous" by the clatter of wooden shoes and the hurrying to and fro of the patients in their sedan-chairs. If you venture into those stairs or passages at these early hours, you are hustled and jostled and driven into corners till you feel that the only safe thing is to get into a sedan-chair yourself.

On looking around on the class of visitors which are met with at Mont Dore, one cannot help being struck with the fact that many of them are persons who have to use their voices a great deal. Groups of priests are encountered at every turn. The faces of well-known singers and actors and actresses are seen on all sides. At the *table d'hôte* I see Madame Christine Nilsson, with Mdle. Baretta, of the Comédie Française, sitting opposite me, and M. Worms, of the Comédie Française, at another part of the table. In the promenade I meet Madame Marie Roze, Mdle. Pierson, of the Gymnase, Signor Tamberlik, M. de la Pommeraye, the well-known Conférencier, and many others who come to Mont Dore to be cured of throat and laryngeal affections. This is, no doubt, its great speciality.

Mont Dore possesses eight warm springs and one cold one. The latter is not looked upon as of any importance. Of the others, two only are ordinarily drunk—viz. La Madeline and the Ramond. The Ramond contains more iron than any of the others.

These two furnish the drinking fountains placed in the *salle des pas perdus* of the Établissement. The other sources—the Cæsar, Caroline, St. Jean, Rigny, Boyer, and Pigeon—are used for the baths. They have all very nearly the same composition, the Ramond, however, being the most ferruginous. The warm springs vary in temperature from 43 degrees to 45 degrees Centigrade—i.e. from 109 degrees to 114 degrees Fahrenheit. It is not a little remarkable, considering the serious claims advanced on behalf of the springs of Mont Dore, that they should be so very feebly mineralised, containing only two grammes (about twenty-six grains) of mineral matter to a litre (about twenty-eight ounces) of water.

They are weak alkaline waters, their chief constituents being the bicarbonates of soda and potash and the chloride of sodium. They resemble in composition the springs of Neuenahr in Germany, but contain only half the quantity of carbonate of soda. Having regard only to the chemical composition of the springs, it is difficult to understand how they produce the important results attributed to them: no doubt their thermality is an important element. Their free carbonic-acid is by no means relatively large. To say, by way of accounting for their activity: “L'électricité dynamique y est très prononcé” is to assume what it would, I take it, be exceedingly difficult to prove. But it has occurred lately to the physicians at Mont Dore to call their waters “arsenical.” They do indeed contain arsenic, but in a proportion much smaller than other springs to which the term “arsenical” has never yet been applied. There is 0·00096 gramme of arseniate of soda in a litre—i.e. about one-seventh of a grain in a quart! But the physicians at Mont Dore construct a convenient theory to excuse, as it were, the feeble mineralisation of their waters. It is this: That certain salts, such as the arsenite or arseniate of soda and potash, are volatilised with greater facility the smaller the amount of mineral matters contained in the water; hence the waters of Mont

Dore, by their feeble mineralisation, are in an especially favourable condition for yielding to their aqueous vapour the chief part of the arsenic which they contain, the vapour being at the same time condensed and under pressure. This reminds me of the saying of a well-known French writer—that a clever man will know how to derive advantage even from his defects. The waters at Mont Dore have been classified at different times under three distinct heads: 1. As waters containing a mixture of alkaline bicarbonates with iron; 2, as weak alkaline waters; and 3, at the present time, as arsenical waters; arsenic being the remedy *en vogue* at this moment! But it would be more in accordance with a scientific method to be content with stating the results of observation and experience, without attempting to explain them by various and conflicting hypotheses; such, for instance, as (*a*) that mineral waters at the moment they escape from their source are in a state of exceptional activity; (*b*) that thermal waters possess peculiar latent chemical properties; (*c*) that they are in a state of dynamic electrification; and (*d*) that their effects depend on the mode of their administration. It will certainly be more interesting to the public to set aside doubtful theoretical considerations and to inquire specially into the practical methods adopted at Mont Dore, and the results that are obtained from them. The waters are administered internally and externally; in the form of ordinary baths and in swimming baths; in the form of vapour and spray; in douches, local and general; in the form of gargles; and in certain special forms that need not be here indicated. The waters are drunk fasting, in the morning, from three to four glasses a-day, leaving an interval of half an hour between each glass or portion of a glass; sometimes milk, sometimes *sirop de guimauve*, sometimes *infusion de tilleul* is added to the water to make it more digestible.

After about fifteen days one becomes, as the local

doctors say, saturated with the water ; a disgust for the water is felt, the digestion becomes disturbed, general fatigue is complained of, and sometimes there is a little fever. Other signs of an overdose of the water are said to be congestion of the face, headache, and giddiness. When these symptoms arise the water must be discontinued. The patients are also made to inhale the condensed vapour of the water, as I have already mentioned, and Mont Dore claims for itself the credit of having first introduced this method of utilising these waters in the year 1833. The patients remain in the vapour from a quarter to three-quarters of an hour. Other patients, chiefly those who suffer from throat affections, inhale the water in a state of pulverisation or spray. Douches of vapour applied locally are also employed and thought of much value in muscular rheumatism and in rheumatic inflammation of the joints, as well as in sciatica and intercostal neuralgia. The patient is seated on a stool and an intermittent jet of vapour is directed upon the part affected. Douches of water, in the form of a jet or a rose and of varying pressure, are also used. They are applied to the spine as a stimulant to the nervous system ; to the joints in cases of lumbago and sciatica ; to the chest in some chest affections, and, indeed, to any part which it is desired to influence specially. The ordinary baths are administered either at a high temperature, i.e. from 107 to 112 degrees Fahrenheit, or at a moderate temperature, i.e. from 90 to 100 degrees Fahrenheit. The latter temperature is considered more suitable to feeble nervous persons, as well as to old people and children.

Finally there are the foot baths, which are thought of great importance here, and are believed to accelerate the circulation in the lower extremities and to prevent any tendency to congestion of the head which the rest of the course of treatment might possibly produce. The patients sit, two in each little compartment, with their feet and legs in wooden baths of hot water of the natural temperature, i.e.

about 112 degrees Fahrenheit. They remain in the bath from five to nine minutes and then walk for at least half an hour afterwards. The duration of the treatment is from eighteen to twenty-one days.

In the next place, what are the ailments to which the course of treatment instituted at Mont Dore is especially applicable? I have already spoken of chronic rheumatism of the joints and muscles, of certain forms of neuralgia, chiefly sciatica and intercostal neuralgia. To these must be added nearly all forms of throat disease, whether of the tonsils, of the pharynx, or of the larynx, and particularly that condition which in England goes by the name of "clergyman's sore throat;" and all these conditions are said to be benefited at Mont Dore. Some forms of asthma and of chronic bronchitis also derive great improvement here. But the most serious claim advanced by the physicians of this place is that they cure pulmonary consumption in the earlier stages and when it occurs in certain temperaments. And detailed accounts have been published, tending to show that, at any rate, certain cases presenting most of the general features and physical signs of consumption have recovered their health after a season, or more frequently two or three seasons, at Mont Dore. These statements, it must however be admitted, have been contested with some warmth and acrimony by the physicians of other French health resorts. For instance, a physician at the neighbouring spa of Royat, in a book on the mineral waters of Auvergne, says, "Pour ce qui est de la phthisie, que les divers médecins du Mont Dore ont la prétention de guérir, nous ne partageons point leur illusion," and the chief physician at Eaux Bonnes, in the Pyrenees, has also attacked the physicians of Mont Dore with much vigour. At Eaux Bonnes they also profess to cure consumption with their sulphur waters, and so a very lively little controversy is in progress between sulphur on the one side and arsenic on the other. After all, this is probably simply a manifestation of the *jalousie*

du métier. Experience alone can show whether these pretensions are well founded or not, and there is this much to be said in favour of making the trial—that the course at Mont Dore only requires a residence of three weeks, and that few persons suffering from so serious a malady as consumption would hesitate to spend so short a space of time as that in the summer months in an agreeable mountain station. It is difficult to believe that the good effects claimed to be produced here in such cases is chiefly due, as some have suggested, to the mountain air; for the brief period of three weeks passed at a moderate elevation could scarcely be credited with so great an influence in arresting the course of phthisis.

The climate of Mont Dore is very variable, storms of rain and thunder coming on suddenly, and in some seasons frequently. Sudden and very localised gusts of wind are also commonly encountered. There is no doubt that the climate can be, and often is, exceedingly disagreeable. An invalid visitor told me that during one season he encountered seventeen wet days in succession; and this where the internal arrangements of the hotels are by no means satisfactory is a very serious matter. Sometimes after a heavy storm of thunder and rain, owing, I suppose, to the disturbing effect of the rain on the accumulations of filth here, all the streams, and even the river (the Dordogne, formed by the confluence of the Dore and the Dogne), and, indeed, nearly every part of the town, become most offensive from bad smells; and many visitors suffer from more or less severe attacks of diarrhoea. Owing to the situation and direction of the valley, the eastern slopes are in shade for a few hours after sunrise, but soon the sun mounts high above the eastern boundary and its rays stream down with great intensity into the deep valley, and it is often excessively hot during the whole of the day. The early mornings and the evenings are mostly fresh and bracing, and the pleasantest days at Mont Dore are those on which the sky is covered with light

clouds, without rain; then the air during the whole day feels fresh and invigorating. The atmospheric pressure is considerably reduced and the average height of the barometer is 26·6. The variations of temperature during the months of June, July, and August are sometimes very considerable, the maximum being 86 degrees Fahrenheit and the minimum 37 degrees Fahrenheit. The average temperature in August is 57 degrees Fahrenheit. The hygrometric condition of the air is, no doubt, favourable to most invalids; it is decidedly a dry air compared with the air of towns—as, e.g., that of Paris—or of the sea-coast. The relative amount of watery vapour in the atmosphere of Mont Dore as compared with Paris is as 9·94 to 15·46. Fogs and mist are, however, frequent, and the season of fine weather is often extremely short. July and August are the finest months. The season scarcely commences before the beginning of July, and is soon over after the end of August.

LA BOURBOULE,

A spa rising rapidly in importance and reputation, is situated only four or five miles from Mont Dore, the road following the course of the valley and the right bank of the Dordogne as it descends towards the north-west. The mineral sources there have become the exclusive property of a company, who appear to be using every effort to develop and popularise the place as a thermal station. A handsome and artistically decorated building has lately been constructed, and forms the *Établissement des Bains*, containing all the appliances of the most perfect bathing place, arranged in the most approved and modern fashion. Many new hotels and villas have been constructed and others are in course of construction, and the whole place presents evidences of enterprise and progress, and is in striking contrast to its stagnant neighbour—Mont Dore. La Bourboule is not so high as Mont Dore, its elevation above the sea being only 2700 feet. It is not so shut in as Mont Dore, but lies in a comparatively wide open valley, surrounded by hills of moderate height and very gentle slope. It is not so well placed as Mont Dore for excursions into the interesting country around, most of the points of greatest interest being more easily reached from the latter. Diligences leave Clermont-Ferrand daily for La Bourboule, and take about the same time in performing the journey as for the ascent to Mont Dore. A railway is in course of construction, and will be completed in five years, which will reach La Bourboule, and it is said Mont Dore also.

Besides the new Établissement, La Bourboule possesses another and older and also an exceedingly well-appointed bath establishment, which belonged till lately to Dr. Choussy, and some unpleasant rivalry and even legal disputes between this gentleman and the company threatened to interfere with the prosperity of the station, but these were settled by the company becoming the proprietors of both establishments. They are both admirably fitted up, and contain all forms of douches, *salles d'aspiration* and *pulvérisation*, a magnificent swimming-bath, *buvettes*, etc. There is also a well-appointed Casino, and there can be little doubt that by the time La Bourboule gets its railway it will be one of the most frequented spas in France.* The two principal springs at La Bourboule, La Source Choussy and La Source Perrière, have the same composition. They are the strongest arsenical waters as yet discovered. Each litre of water contains nearly six grammes (seventy-eight grains) of mineral substances, of which nearly three grammes are bicarbonate of soda and nearly three grammes chloride of sodium. So far, it corresponds in composition with Ems water, but it is considerably stronger. Then in each litre there is contained twenty-eight milligrammes of arseniate of soda—i.e. about one-third of a grain in twenty-eight ounces. It has been seen that the Mont Dore water contains only one-eightieth of a grain of arseniate of soda in the same quantity of water. They also contain a small quantity of iron. The Sources of La Bourboule have also a high temperature; the La Perrière spring has at its surface a temperature of 50.5 Centigrade, or 123 degrees Fahrenheit. It is, however, the pos-

* The railway is now open as far as Loquenille, which is within an hour's drive of La Bourboule and about an hour and three-quarters from Mont Dore. The train which leaves Paris at 8.30 a.m. reaches Loquenille at 9.25 p.m., and (by the omnibus service) La Bourboule at 10.45; and the train which leaves Paris at 8 p.m. reaches Loquenille at 9 a.m., and La Bourboule (by carriage) at 10.

session of this considerable quantity of arsenic that determines the special uses and application of the waters of La Bourboule.

Apart from the arsenic contained in them, it has been maintained that these waters resemble in composition the serum of the blood, and much stress is laid on this as showing their applicability to cases of arrested development, defective nutrition, cases of slow convalescence, and other forms of general debility. In all scrofulous affections, such as enlarged glands, scrofulous discharges from mucous membranes, diseases of the bones, etc. these waters are said to produce remarkable benefit. But it is more especially in the chronic forms of skin disease that La Bourboule claims to effect the most remarkable cures, and chiefly when they arise in connection with a rheumatic or scrofulous constitution, or as the result of simple debility. Certain forms of rheumatism and gout are also greatly benefited here. The scrofulous form of pulmonary consumption, nasal and pharyngeal catarrhs, asthma, and chronic bronchitis are all said to be improved by the use of the Bourboule waters. So that La Bourboule claims for itself a very extended sphere of usefulness, and its comparatively mild mountain climate tends to aid the curative effects of its waters. They are applied in much the same way as those of Mont Dore. It need scarcely be remarked that, containing so large a quantity of such an active agent as arsenic, their use and application needs very careful medical surveillance. It seems to be admitted on all sides that La Bourboule has a great future before it as a health resort of the first importance.

CHAPTER VI.

SOME RHENISH HEALTH RESORTS.

VACATION STUDIES OF SOME OF THE PRINCIPAL HEALTH RESORTS IN THE RHINE DISTRICT.

“Monsieur ! Monsieur ! à six heures du matin vous prendrez à la Pauline trois verres ! Trois verres à la Pauline !! A dix heures vous prendrez un bain, en sortant du bain vous prendrez encore deux verres, et à cinq heures du soir, Monsieur, vous prendrez . . . encore trois verres ! Monsieur ! ces eaux vous feront beaucoup de bien.”—*Bubbles from the Brunnen of Nassau.*

BETWEEN Bonn and Mainz, on both sides of the Rhine, lies a district richer in important mineral springs than probably any other part of Europe of similar extent. The names of some of these are very familiar to the ears of English doctors and English patients, and it may seem that there can be little that is new to be said of any of them. But medical science and, therefore, medical practice undergo perpetual changes, and the remedy of one generation is no longer a remedy in the next, or, if it still holds its place, it is most likely as a cure for some quite different malady. Cures come into fashion and fall out of fashion, and the utility and applicability of various health resorts vary in popular and, indeed, in professional estimation, as knowledge and experience of their effects grow and widen. It will not therefore be unprofitable labour to take a brief survey of even

some of the best known and most familiar health resorts, and note in what respects they have changed in reputation and in what respects they remain as they were. Many considerations, too, of great public interest apply with especial force now to the more popular and frequented of health resorts. I allude especially to their sanitary condition and to the provisions which obtain in them for the prevention of the origin and spread of epidemic and contagious diseases. The methods also still in vogue in the use and application of the stronger, and indeed of all mineral waters, are probably in many respects faulty, too much a matter of mere routine and too much the result of uninterrupted precedent. A little disinterested scrutiny and friendly criticism may not be without good fruit. On the other hand, some quite novel and useful modes of application of mineral springs and other curative agencies in connection with some of the Rhenish health resorts cannot fail to be of interest to the many seekers after health which our ailing humanity always includes. It is now many years ago since Sir Francis Head, coming to Schwalbach for the benefit of his own health, wrote those charming sketches of life at some of the Rhenish spas, which he published under the title of "Bubbles from the Brunnen of Nassau." The taste for long digressions and interpolated legends which form so large a part of that volume has probably completely passed away, still many will not fail to find much that is attractive in the pleasant and graceful style of those "literary bubbles." In the sketches which I have attempted of some of the same resorts as those described by Sir Francis Head, the reader will, I fear, miss the literary charm of that gifted writer, but, on the other hand, I have endeavoured to provide a detailed professional estimate of their respective merits.

NEUENAHK.

In journeying up the Rhine the first health resort of any note that we come to is Neuenahr. It is situated in the valley of the Ahr, a small river which joins the Rhine at Sinzig, a little above Remagen, and about midway between Bonn and Coblenz. You descend from the train or disembark from the steamer at Remagen in order to visit Neuenahr. Remagen is an hour and a half's railway journey from Cologne.

If the weather should be clear no one will regret having to spend an evening at Remagen (it is not necessary to do so, as it is only a drive of an hour and a half from that town to Neuenahr) and witnessing a sunset, from the adjacent Apollinarisberg, over this exquisite piece of Rhine scenery. The Apollinarisberg is crowned by an elegant Gothic church, with four towers, the Apollinaris Kirche, and it is from the platform on which the church is built that a view is obtained over the most exquisite bits of river scenery that this beautiful stream affords. Seen by the setting sun as the shadows of evening creep over river and mountain, the silvery surface of the stream and the contrasting deep sombre tints which cover the mountains give a majestic grandeur and beauty to the scene which is almost inconceivable to those who have only seen the river from the deck of a Rhine steamer. It is true that this is one of the finest sunset views on the Rhine. It takes in the banks of the river from Hönningen to Königswinter. The bend of the river incloses in its curve a fertile tract, which forms the foreground, while moun-

tains close in the landscape on all sides, and in one direction the Siebengebirge, with the Drachenfels, form a prominent and striking feature in the landscape. No one who has ever witnessed a sunset from the Apollinaris Kirche at Remagen will ever again speak slightly of Rhine scenery.

The Ahr valley from Remagen to Neuenahr is uninteresting. The valley is wide and bounded by low and gently sloping hills; only one considerable hill, the Landskron, is remarkable, as it stands alone, a truncated cone of basaltic rock about 900 feet high, and forms a very prominent object. Near this rock we pass the Apollinaris Brunnen, the source of the Apollinaris water so familiar now to the British palate. The thousands of glass and stone bottles piled up over a great extent of ground indicate a commercial activity in connection with this spring altogether unparalleled. The scenery improves as we approach Neuenahr, which is built on both sides of the river at the foot of a high wooded hill, rising for nearly 1000 feet above the village, and commanding a magnificent view. But the really picturesque part of the Ahrthal, and that which forms the principal excursion for the visitors at the baths, commences about two miles from Neuenahr, at the ancient little town of Ahrweiler, completely surrounded by its old walls, in excellent preservation, and with a fine gate tower at each end of the town. From this town to the ancient village of Altenahr, where the beauty of the scenery culminates, the valley for nearly seven miles is picturesque in the extreme; the river winds with many a sinuous curve along its tortuous bed, while precipitous rocks hem it in on each side, save where here and there the valley widens and the swift stream spreads out into a broad and shallow river. The steep black slate rocks on the left bank, with their southern exposure, are covered from base to summit with terraces, over which extend, all along the valley, vineyards kept with the greatest care, the vines yielding a generous red wine which is much valued.

At Altenahr the scenery is extremely wild and

beautiful. Enormous masses of black jagged rocks, most picturesque in form and situation, stand boldly up from the floor of the valley. On one of these stand the ruins of the Castle of Altenahr—an ancient fortress dating from the tenth century—dominating this narrow part of the Ahrthal. A visit to the Castle of Altenahr enters into the programme of every visitor to Neuenahr. It is within an hour and a half's drive; there is a good hotel at the end, and the scenery quite repays the trouble. But the serious business at Neuenahr is to bathe in and drink the waters and get rid of whatever ailment brings one there; and it is a serious object which brings most people to Neuenahr, as there is little or nothing else there to attract the idle and aimless. There is a comfortable Kurhaus in pleasant and extensive grounds, with shady walks and agreeable spots to lounge in. The food is good and the life simple and placid. The baths are in the Kurhaus, and are well organised, and furnished with the usual array of douches of all kinds to stir and stimulate our sluggish organs. The springs at Neuenahr belong to the group of mild alkaline waters. They are warm and contain a considerable quantity of carbonic-acid. This gas is allowed to escape freely into the air from the principal spring, which is thus seen to seethe and boil and foam as it pours from its source into a basin, around which a well-shaped inclosure is built. Here the carbonic-acid can be seen to form a dense and dangerous atmosphere over and around the spring—a dangerous one indeed, for on one occasion a few years ago a little child while at play descended into the inclosure to get a ball it had lost, as it did not return another followed it, and then a third. They were all three removed in a state of insensibility, and one, the first who descended, did not recover. There are probably great quantities of this gas stored up, a little below the surface, in this part of the valley, and it is noticed in consequence that mice are never found in many of the houses. There are four springs in use—the chief of these are the Victoria and the Grosser Sprudel. The tempera-

ture of the latter is 104 degrees Fahrenheit ; the others are not so hot. A pint of the water contains about eight grains of bicarbonate of soda and two and a half of magnesia, besides lime and small quantities of common salt and sulphate of soda and an appreciable amount of iron—appreciable I mean to the palate, although there is only about one-twenty-fifth of a grain to a pint.

The uses of these springs are various, depending on their mildly solvent alkaline action, so that they are especially applicable to cases of biliary and urinary concretions and their consequences ; to cases of atonic gout, and especially those cases where it is important to avoid the stronger alkaline and saline springs of Homburg, Tarasp, Carlsbad, and Vichy. Cases of gout which require very gentle treatment and which support badly the depletory effects of stronger mineral waters—cases, for example, associated with a weak heart and feeble circulation—these are well suited to treatment at Neuenahr.

Cases of chronic rheumatism are treated here, and notably that which produces great deformity and crippling of the joints (*arthritis deformans*). The excellent resident physician, Dr. Richard Schmitz, assures me that he has obtained remarkably good results from the use of the Grosser Sprudel, followed by shampooing, in some of these distressing deformities. Of chest diseases, cases of chronic bronchial catarrh are much benefited, so are certain cases of chronic Bright's disease. Forms of dyspepsia with obesity, or fatty liver, and associated with a feeble heart, are better treated here than by the stronger and more depressing courses of Marienbad or Carlsbad. But it is, above all things, to the successful treatment of diabetes that Neuenahr owes its great and increasing reputation. The physician whose name I have just quoted has made a careful and special study of this disease at Neuenahr, and the results he has published of the effects of treatment there are very remarkable and encouraging. Some

of these diabetic patients begin by drinking enormous quantities of the water, which they gladly do to quench the intolerable thirst from which they suffer. A patient beginning with nine glasses of the Grosser Sprudel daily gradually increased it to five glasses before breakfast in the morning, six glasses at ten a.m., and five more at five p.m. This did not, however, quench his thirst, for he drank during the night nearly a quart of cold Sprudel! In thirty-eight days this patient had entirely lost the characteristic sign of diabetes.

Dr. Schmitz is careful to insist on a strict observance of a correct dietary, although he by no means shares the prejudices commonly encountered in German spas as to certain articles of diet. He makes some of his patients eat salad three times a-day; and he laughs at the prohibition of butter, which, as he says, could with the alkaline water only make a little soap, and is far less objectionable than the greasy *ragoûts* one is so constantly presented with at the *tables d'hôte*. I was glad to find that this experienced physician was strongly impressed with the folly of making feeble and delicate invalids rise at very early hours in the morning to drink quantities of cold or even warm mineral water. He had observed, as most careful and unprejudiced physicians must have noticed, how badly these early draughts of water, as well as bodily exercise at these early hours, are borne by many feeble and delicate persons, and he had known many instances of great impairment of health produced by adherence to this routine.

Upon inquiry into the sanitary state of Neuenahr, I was assured that it was very satisfactory. Dr. Schmitz had only known of one case of typhoid fever during a residence of eighteen years. Yet there is no drainage, properly so called; the sewage matters are allowed to accumulate in cesspools and these are emptied between the hours of eleven p.m. and four a.m. and their contents buried in the earth. There is no doubt that many of the wells from which the poorer inhabi-

tants draw their supplies of drinking water are largely contaminated with sewage matter, and the absence of typhoid proves that sewage matter of itself is not capable of generating typhoid unless it contains the germs of typhoid derived from some infected organism.

Finally, with regard to the climate of Neuenahr, it is said to be very dry and healthy, and to have a very even temperature; but from my own observation I should say that, in common with much of the Rhine district, it is subject at times to heavy morning mists. There is generally a current of air blowing along the valley, "but from the position of the town, with protection on the north by vine-covered hills and on the south by wooded heights, it is usually warm. The tortuous rocky defile below Altenahr closes the valley on the west, and there are no side valleys by which eddies and cold currents may be produced. During the spring and summer the wind is usually from the south-west or south, and coming over great woodland districts is pure and refreshing, but never cold." I am told that wild boars abound in the adjacent forests and afford good sport, and that not long ago three of these animals bounded through the garden of the Kurhaus, much to the astonishment and alarm of the visitors. In a few months Neuenahr will have a railway connecting it with that on the left bank of the Rhine, and visitors will be spared the unpleasant jolting which they now experience in driving over the badly kept roads between it and Remagen.

EMS.

The next considerable spa in proceeding up the Rhine is the well-known Bad Ems, twelve miles from Coblenz, in the beautiful valley of the Lahn. Ems has been called the "pearl of German baths," and there are many reasons for calling it so. Its natural situation is very beautiful, and art has been liberally applied to aid nature in its embellishment. The society assembled there is often of the most select description. Princes and ambassadors, kings and emperors, walk about among humbler people whom the common infirmities of humanity bring, if not to the same level, at any rate to the same source. There is a considerable solemnity, however, about the very gaiety of Ems, which indicates a consciousness that imperial and princely shadows have long and often rested on its pathways; none of the loud noisy gaiety such as you find, for example, at a bath like Luchon, in the Pyrenees.

Ems extends for a considerable distance along the right bank of the river Lahn. Along this bank, at the lower part, is the old Dorf Ems, where most of the poorer inhabitants dwell, while the upper part consists of handsome hotels and shops, and the Kursaal and the Kurhaus and the springs are all on that side of the river, together with some prettily laid-out, shady, park-like walks. On the left side of the river there are also bath-houses, and many fine villas and hotels, a Russian and English church, etc., for the most part protected from the sun by the shade of the surrounding woods among which they are built, and many

shady walks and drives extend up the wooded mountain-side on this left bank of the river. On both sides of the river rise high hills ; those on the left are clothed with trees to their summits, and afford many a pleasant shady walk or drive ; those on the right are steeper, barer, and more rugged, but with many wooded and vine-clad patches.

The pedestrian can find many attractive walks, with fine points of view, varying from half an hour to an hour and a half's distance from his hotel. One of these, and the most distant, about three miles from Ems, mounting by a zigzag road through shady woods, is called by the attractive name of the *Schöne Aussicht* ; but it is very disappointing, and presents a much less pleasing view than many of the less distant heights. It is the highest point (1300 feet) in the neighbourhood, and for that reason there is little that is picturesque in the view, which is, however, very extensive, stretching to a great distance over a high tract of land of somewhat monotonous and nearly uniform elevation. It is true a small and distant bend of the Rhine can be seen in one direction and the Taunus hills in another ; but, although extensive, the view is exceedingly tame. It is one of the most striking instances of the loss of the picturesqueness of surrounding scenery by looking down on it from a considerable elevation. Above the upper part of Ems, on the right bank of the river, rises somewhat abruptly a high, sharp-crested, jagged hill, on the top of which there is a tower, the *Concordia Thurm*, which commands a fine view over the town and the river. The interesting old town of Nassau is also a beautiful drive of four miles up the valley. But there is no lack of good excursions from Ems, either for riding, driving, or walking, while on both sides of the river there are an abundance of shady walks and lounges. A fine covered walk in the centre of the public gardens, near the *Kursaal*, affording shelter both from sun and rain, was erected in 1874, at the special request of the Emperor William, and is a real

boon to the place. An historical monument of which Ems is proud is a small white stone let into the ground near where the band plays in the morning, with the simple inscription: "15 Juli, 1870, 9 Uhr Morgens," and which marks the spot where King William stood when he caused his memorable answer to be given to the French ambassador, Benedetti. The people of Ems are very fond of their old Emperor, and many stories are current there of the friendliness and simplicity of his manners. On one occasion he invited all the doctors of the place, twelve in number, to meet him. He received them sitting on the edge of a table, and talked familiarly with them for some time, contriving to show that he knew something of each of them individually, and on bidding them adieu he said: "Now, gentlemen, you need not know me when we meet again, for I am a poor man and cannot afford a new hat frequently." Ems used also to be a favourite resort of his nephew the late Czar, who was in the habit of coming here in great state, bringing with him a long retinue of servants and courtiers, and forty horses, while his imperial uncle was content with four. Corruption, the natives assert, was rampant in the Russian train. Diamond rings and snuff-boxes were always distributed largely at the end of the Czar's stay, and were bought back again at reduced prices to do similar service elsewhere.

Ems has the reputation of being hot and relaxing, and no doubt it can be very hot at Ems during the height of summer; but the early mornings and the evenings are cool, especially in the months of May and September, which are probably far the pleasantest months of the season, although by no means the most popular. Great pains have been taken, by cultivating trees in the public gardens, to afford as much shade as possible, and to provide cool retreats from the midday heat, while the abundance of water available enables the roads and the trees to be watered three times daily.

Ems is abundantly supplied with mineral springs ;

there are five principal ones, all having nearly the same chemical composition and differing only in temperature. The hottest is the Kessel Brunnen, 120 degrees Fahrenheit; then the Fuersten Brunnen, 102 degrees Fahrenheit; the Augusta Quelle, 101 degrees Fahrenheit; the Kraenchen, 90 degrees Fahrenheit; and the coolest, the Victoria Quelle, 80 degrees Fahrenheit. Those of the higher temperature are best suited to a certain class of cases, those of the lower temperature to others. The Ems springs belong to the medium alkaline group, containing ten grains of bicarbonate of soda to a pint, while they also contain a moderate quantity of common salt—seven grains to the pint. They also contain carbonic-acid in moderate amount, and they are warm. Of all the German waters containing a considerable amount of both carbonate of soda and common salt, Ems is the only one that is warm. It is this that characterises its springs, and to a great extent determines their application and utility. They also contain lime and magnesia, and a small amount of lithia.

Ems is a ladies' bath *par excellence*, and is indicated when soothing rather than bracing treatment is required. Of the other uses of its waters, the chief are chronic catarrhs of the throat and air passages, and for the treatment of those affections they are drunk, used in the form of inhalations, and as gargles, and also they are bathed in. It is applied in certain forms of gout, especially those that require gentle rather than active treatment, or that are associated with bronchial catarrh or urinary calculi. In some forms of dyspepsia, with congestion of the liver, or inflammation of the bile ducts or chronic diarrhœa, the Ems waters often do good. Those chronic affections of the joints resulting from attacks of rheumatic fever are said to do well here. It used to be the fashion to send consumptive patients to Ems, but *nous avons changé tout cela* with a vengeance. The warm relaxing air and the hot springs of Ems

are now regarded as absolutely prejudicial in case of phthisis, and it is certain that attacks of hæmoptysis have frequently been induced by drinking the hot springs here. The climate of Ems is mild and relaxing, and from the beginning of July to the middle of August the midday heat is often very great. The town is, however, reported to be very healthy. It is abundantly supplied with water and well drained, the outflow of sewage being into the river some distance below the town.

Each house, however, is "furnished with well-cemented and air-tight cesspools," the upper part of which is connected by a pipe with the general system of drainage, but the solid sewage is allowed to accumulate, and is removed during the winter and used as manure. One of the great recommendations of Ems is its exceeding accessibility and the good hotel accommodation provided there.

Tradition still governs the method of drinking the waters at Ems, and the invalids, young and old, active or feeble, begin to consume their daily allowance between six and eight a.m. The dose is repeated in the afternoon between four and six. The early morning hour is, no doubt, a good time for taking warm solvent water in many cases, but it does not admit of doubt that many feeble and delicate constitutions would do better to remain in their beds until eight or nine o'clock, take a light breakfast on rising, and drink their first dose of water at eleven.

HOMBURG.

The manifold virtues of common salt give to the group of health resorts, which includes Homburg, Nauheim, Soden, etc. their reputation, and to their mineral sources their curative effects. The springs contain many other constituents besides chloride of sodium, but it is the predominating and characteristic constituent in all of them. For example, in the strongest of the springs at Homburg—the Elizabethen Brunnen—out of the one hundred and two grains of solid constituents which are contained in a pound of the water there are seventy-five grains of common salt ; and in the weakest—the Louisen Brunnen—out of thirty-two grains there are twenty-three of common salt. The strongest of the springs at Nauheim contains, out of three hundred and twelve grains of solid constituents, two hundred and sixty-five grains of common salt ; and the weakest one hundred and nine grains out of one hundred and thirty-seven. At Soden, also, the chief constituent in all the springs is common salt in varying proportions. These springs, then, are all salt springs ; their uses depend very much on the relative proportions of common salt in each of them.

But the possession of springs containing common salt is scarcely sufficient to account for the extraordinary popularity of Homburg, for Nauheim has springs which contain much more. Nor is it exactly accurate to say, as one of the local authorities does, that “art and nature have combined to make of Homburg and its environs an earthly paradise.” If, with the touch of a magician’s wand, we could remove everything from Homburg that art has placed there—the

cultivated trees and shrubs, the ornamental park-like grounds, the pretty villas, the magnificent Kursaal and its surroundings—the natural situation of Homburg could scarcely be called picturesque. The grounds to the east of the town have been very prettily laid out, trees have been freely planted, and shady avenues abound. The lawn-tennis ground especially is very prettily placed; and the visitors are received into lodging-houses of an attractive and superior kind. But nearly all this is the work of art rather than nature. An exceedingly ugly uniformly flat stretch of country lies between Homburg and Frankfort. This plain rises gradually till it reaches the foot of the Taunus mountains, and Homburg lies in the upper part of this plain, at an elevation of 350 feet above Frankfort.

It is true that on the east side of the town the ground is undulating; the wells are situated in a depression, and some low hills covered with woods afford many shady walks and drives close to the town, while less than an hour's walk brings one upon the beautifully wooded slopes of the Taunus mountains; but the sight of Homburg itself is not picturesque, and if a visitor never went beyond its ugly main street, with its rough pavement, he could not fail to carry away a most unfavourable impression of it. But almost everything that art could do has been done to make the surrounding of the springs attractive; and pleasant shady avenues and covered walks, palm-houses and parterres of flowers, and other attractions give to the neighbourhood of the mineral springs a very pleasing aspect. Certainly if one is doomed to drink physic every morning for three or four weeks, it is an excellent idea to get it bubbling fresh and clear and cool out of the ground in a pretty park, handed to you by a comely maiden in the company of well-dressed people in the fresh air and early hours of a bright summer morning, to the strains of sweet music with the enlivenment of cheerful conversation, and, perhaps, not without a little flirtation to fill up

the intervals between the doses of one's medicinal restorative. A local advocate of the virtues and attractions of Homburg approaches this part of the subject very boldly and writes : "Are there not hopeful sons and blooming daughters to be married and provided for, and have not many of them found eligible partners in the watering-places?" And he adds : "The writer himself knows several such couples who were struck by Cupid's arrow at the Stahl and Louisen Brunnen, and Hymen afterwards had to take pity on them!" There can be no manner of doubt that the attractiveness and the popularity of Homburg are quite as much dependent upon social considerations as upon medicinal ones. Something must be said in favour of the climate of Homburg. It is unusually dry and bracing for a place of such moderate elevation—650 feet above the sea. This is due to the absence of streams and rivers and to the absorbent nature of the soil, and to the position of Homburg on a raised portion of a wide plain, the neighbouring mountains being sufficiently distant to keep the mists and clouds which frequently settle over them from influencing its atmosphere.

From its somewhat exposed situation it suffers from the heating effect of the direct rays of the sun, but, as a compensation, cooling currents of air blow down from the distant forest-clad hills, and the mornings and evenings are fresh and exhilarating. There is a very general consent among those who have frequented the place for many seasons that "Homburg is bracing."

Homburg has several mineral springs ; the chief of these, and the one that has obtained a world-wide reputation, is the Elizabethen Brunnen, and it is around this source that the gaily-dressed crowd gathers during the early morning hours, from six to eight, when mineral waters are presumed to have the greatest efficacy. The Ludwigs Brunnen has also its admirers, but it has an afternoon popularity rather than a morning one. Then there are the Kaiser Brunnen, the

Louisen Brunnen, and the Stahl Brunnen. A few words about each of these and their uses will not be uninteresting to those who have to drink either of them. They all contain salt, common salt, but in very different amounts. The Elizabeth spring contains seventy-five grains in a pint, the Ludwig thirty-nine, the Kaiser fifty-five, the Louisen twenty-three, and the Stahl about forty-five, so that the Ludwig is about half and the Louisen about a third of the strength of the Elizabeth spring. Then they all contain iron in varying proportions; the Stahl Brunnen, as its name implies, contains much more than the others—three times as much as the Elizabeth and nearly twice as much as the Louisen, which is the next strongest in iron, while the Ludwig contains scarcely any. Perhaps the next most important ingredient in these springs is carbonic-acid gas. Here, again, there are considerable differences. The Kaiser contains the most—one-third as much again as the Elizabeth or the Louisen, and the Louisen contains the least. The presence of a small amount of sulphuretted hydrogen gas in the Kaiser Brunnen makes it less pleasant and less acceptable as a drinking spring, and the existence of an appreciable quantity of this gas in the Louisen and Stahl Brunnens undoubtedly detracts from their merits as chalybeate springs. With regard to the other constituents, there is wonderful uniformity in all these sources, the only difference being one of quantity. Besides the chloride of sodium (common salt) they contain chlorides of magnesium, calcium, ammonium, potassium, and lithium. The first two of these amount to ten to twelve grains in a pint of the Elizabeth, and are of some importance. Is it easy to determine what are the special uses of the Homburg springs from a consideration of their composition? It would seem not; there appears to be abundant room for differences of opinion. It is easy to dispose of the iron at once by admitting that it gives a tonic property *pro tanto* to all the springs into which it enters as an ingredient, and that, according to the case or the constitution, its tonic

effects may be accelerated or hindered according to the nature of the other constituents with which it is combined. It may also be said of the carbonic-acid that its presence usually (not with all persons, however) aids the digestion of the water, and exercises a beneficial stimulating effect on the stomach and also on the skin when the waters are taken in the form of baths. It must be borne in mind that it is next to impossible to decide altogether *à priori*, i.e. from a mere consideration of the component parts of a mineral spring—what will be its effects in all cases or in any particular case.

In the final appeal experience must be the test, especially for an appreciation of delicate details of applicability. For it has been well observed that mineral waters are very composite remedies, and we cannot regard the combined action of a great number of substances merely as the sum of their separate actions, since they may partly aid and partly hinder each other in their effect upon the organism. In these very springs, for instance, we find the aperient chloride of magnesium counteracted by the astringent carbonate of lime. It is often said by those whose opinions should carry great weight, and on *à priori* grounds, that drinking the Homburg waters is useless in gout. It is an opinion which merits very careful consideration, but if this opinion is met by the universal cry, "Whereas I was lame, now (after drinking at Homburg) I walk," a general consent of this kind, founded on experience, would outweigh all theoretical statements. But if we meet with a number of persons who, on the contrary, say: "Lame I came, and lame I depart," then it may be as well to reconsider whether Homburg is the best place to send gouty patients to indiscriminately. To this question a negative answer would be given by many authorities. If Homburg, it is said, in addition to its Elizabethen Brunnen, had a mild, warm, alkaline spring, like the springs of Neuenahr or Ems, it would be worth all its other springs put together in the treatment of

many forms of gout—forms of gout which are unmistakably made worse by drinking these sometimes exciting common salt waters. The best test that a mineral water is doing one good is the very practical one that one daily feels better and stronger. The appetite is better, exercise is less fatiguing, sleep is sounder and more refreshing, and there is a consciousness of returning and increasing energy, both intellectual and physical. He is a bold physician who, in the absence of any of these signs, relentlessly urges the unfortunate patient to persevere in irritating his stomach and his nerves with the promise of some far-off advantage.

The Homburg course is, no doubt, of great value in some cases, especially in certain forms of dyspepsia, where the organs of digestion require vigorous stimulation, and rousing out of their sluggish inactivity. Many such cases have gouty and rheumatic tendencies, and then a combination of drinking and bathing in these salt and carbonic-acid waters is of great service. But it would seem that many rheumatic and gouty cases require a less highly mineralised, less exciting, and more solvent alkaline water. This is the point to be borne in mind, and it must not be overlooked that common salt waters, unless very weak, are irritating to certain constitutions, and quite capable of exciting gastric catarrh, which in others they may cure.

Much advantage, no doubt, attends the routine of rising early every morning and promenading in cheerful society for an hour or two in the fresh morning air; but some are induced to do this who had better remain in their beds. No inconsiderable benefit is doubtless derived from the simple ingestion of a quantity of water, independently of and sometimes in spite of its mineral contents. The action of the chloride of sodium in these springs is believed to depend on its influence in promoting those changes of the tissues of the body necessary to healthy nutrition. It helps us to get rid of the "old man," the worn-out or half worn-out parts of us that linger about our bodies and clog

and impede their mechanism, and interfere with our vital chemistry ; and it helps us to build up a " new " and better man. It helps us to get rid of our somewhat ill-defined aches and pains and infirmities, which an artificial existence and a too busy or too careless life induces ; and it would do this, perhaps, far more effectually if we did not find here too much of that very artificial and conventional life which brings these evils in its train. Scrofulous diseases of the glands, of the bones, of the skin—"torpid scrofula," as it is called—are treated advantageously with these salt waters, and especially with the salt baths ; although, as we shall see, Kreuznach claims especially the cure of these maladies. Many sufferers from chronic muscular rheumatism and chronic gout find great advantage from combining the use of these Homburg waters with that of the pine-leaf baths which are prepared here. An extract of pine leaves is added to the heated salt spring, and a very grateful aromatic bath is thus produced. Mud baths, such as are given at Marienbad, can also be obtained at Homburg, but they are costly. A few words as to the sanitary condition of Homburg. Some excitement was caused, not unnaturally, by the circumstance that several cases of typhoid fever occurred here in the season of 1879, and another and a fatal case the next year. It seems, however, that all these cases were distinctly traced to the consumption of water from one particular well in one particular hotel. This well has been sealed up, and strict police regulations have been carried out to prevent the possibility of so serious an accident again occurring. All the houses are compelled to draw their supply of water from that which is brought direct from the distant hills, and every effort is made to keep the drains well flushed and to avoid the possibility of any insanitary conditions again arising. The outbreak of typhoid having been thus traced to its source and fully accounted for, every precaution has since been taken to maintain the sanitary state of the town.

NAUHEIM.

Nauheim, although comparatively little known in England, is one of the most important salt baths in Germany. Unlike its more popular neighbour, Homburg, it is altogether a "serious cure," and not a resort of pleasure. The visitors to Nauheim are chiefly, if not exclusively, invalids. The magnificent Kursaal bears witness of the time when gaming tables existed there, and when it shared with Homburg the patronage of gamblers. Now a few invalids only are seen wandering about the spacious apartments and the adjacent shady and pleasant grounds.

Nauheim is situated at the foot of a fine-wooded hill, the *Johannisberg*, one of the outlying spurs of the *Tamus*, at a distance of about twenty miles from Frankfort, an hour by rail, and twelve or thirteen miles from Homburg, a pleasant drive of two or three hours. Its springs are sufficiently rich in salt to make its extraction a profitable industry. Of its springs, five in number, three are used exclusively for bathing and two for drinking. The three bathing springs are hot, and issue from the ground at a temperature varying from 82 degrees to 96 degrees Fahrenheit. They also contain an abundance of carbonic-acid, and one of them shoots out of the ground with great force and with much bubbling and foaming, and sometimes rises in a jet to a height of forty-four feet. This is the *Frederick-William Sprudel*, a very important spring, on account of the amount of common salt it contains—two hundred and sixty-five grains in a pint—on account also of its warmth, its temperature

being 96·4 degrees Fahrenheit, and of its richness in carbonic-acid, 48,000 cubic feet of this gas escaping in twenty-four hours. The combination of these three properties—high temperature, richness in common salt, and carbonic-acid—renders it, according to the learned resident physician, Professor Beneke, unique among European mineral springs. The two drinking springs, the Kur Brunnen and the Carls Brunnen, are weaker, though these are considered by Professor Beneke too strong to be drunk pure in most cases, and he has been the first to introduce the wise practice of diluting these waters with another gaseous spring, containing but a small quantity of chloride of sodium and an appreciable amount of iron; and by this means he obtains a water scarcely distinguishable in its taste and its effects and of nearly the same composition as the celebrated Ragoczy water of Kissingen, the chief difference being that the Ragoczy contains four and a half grains of sulphate of magnesia in a pint, which the Kur Brunnen does not contain; while it contains, when diluted, five grains of chloride of calcium in a pint, which does not exist in the Ragoczy. Professor Beneke had often observed that the undiluted salt springs did not agree with the digestive organs, and this led him to the practice of dilution, an innovation which deserves imitation. The bathing springs are used of their natural temperature and composition; very rarely they are made stronger, as at Kreuznach, by the addition of “mother lye.”

The duration of these strong salt baths varies from five minutes to an hour, according to the effect desired to be produced. Sometimes they are used in the form of stream baths, fresh brine running into the baths at one end and a similar quantity running out at the other during the whole course of the bath. This kind of bath has to be employed with caution, for by constantly surrounding the body with fresh brine and fresh carbonic-acid, a highly exciting effect is produced on the nerves of the skin. The salt water is also used as douches and for local fomenta-

tions. There is also a *salle d'inhalation*, where the brine is driven into spray by suitable apparatus. In some cases it is found necessary to dilute the mineral water before using it in the baths, on account of the irritating effect it produces on the skin; while in other cases, where it is thought necessary to produce very active stimulation of the skin, "mother lye" is added to make it stronger. The abundance of carbonic-acid gas set free from these springs has led to the use of a gas bath at this spa. The patient sits enveloped up to the neck in an atmosphere of carbonic-acid gas, and in some cases of gout it has proved serviceable.

As Nauheim may be taken to be the type of a strong salt spa—a "sool" bath, as it is called in Germany—it will be interesting to inquire what are its real uses and value, and in what respects it differs from hot and cold sea-water baths. First come the various forms of scrofulous diseases, and of these, scrofulous eczema seems to have been specially benefited, as well as cases of eczema in which there was no observable taint of scrofula. This cure of eczema often occurs as an "after-effect." Professor Beneke writes: "Some of my patients, who left without any improvement, reported to me, about eight or ten weeks afterwards, their perfect recovery."

In scrofulous affections of the glands and of the joints, the nightly application of the salt water or the "mother lye" to the parts affected has been found highly useful, but in many cases of scrofula, especially when associated with much debility, and when there is danger of over-stimulating a feeble and irritable nervous system, Professor Beneke believes sea air and sea baths to be far more applicable. It is in certain forms of gout and rheumatism that these salt springs are said to be especially efficacious. To use rather technical language, "retarded metamorphosis of nitrogenous compounds" is regarded as lying at the root of these complaints. The nitrogenous compounds, entering into the composition of our food, or formed

in the processes of nutrition, are checked in their process of metamorphosis ; and it is the property of these salt springs, as I have already hinted, to promote and hasten these necessary changes. For such patients simultaneous regulation of the diet is of extreme importance, and Professor Beneke would have the hotels and the *tables d'hôte* at all such places placed under the strictest medical supervision ; and from this point of view he ridicules the mode of living pursued at Homburg.

One very interesting and important result has attended the careful scientific observations of this excellent physician at Nauheim : it is that the heart affections resulting from attacks of rheumatic fever, so far from counter-indicating the use of these salt baths, as was formerly supposed, are especially benefited by a careful application of them. He has observed the valvular defects in some instances removed, and in most cases the natural effort at compensation greatly aided ; while the pulse, instead of being accelerated, is usually diminished from six to ten beats in the minute.

Paralysis dependent upon undoubted changes in the nervous centres themselves, Professor Beneke does not find benefited by the Nauheim baths ; but if the paralysis depends on rheumatic affections of the coverings of the nervous centres, then improvement often follows.

One great advantage of these salt and carbonic-acid baths is that, owing to the combined stimulating effect of the salt and carbonic-acid on the skin, persons can remain much longer in these baths at a lower temperature than in other baths. Sea baths lack the presence of carbonic-acid, and cold sea baths cannot be supported for any length of time. On the other hand, the tonic and alterative effects of sea air present advantages which, in combination with warm sea baths, gives them a value which inland salt baths do not possess.

SODEN

Is another of the common salt spas which we find on the southern slope of the Taunus mountains. It is connected with the Taunus railway by a branch at Höchst, and so is brought within half an hour of Frankfort. It is about nine miles from Homburg, and is prettily situate in a valley bounded to the north by wooded hills, which form, as it were, the base of the two highest peaks of the chain, the Alt König and the Feldberg. It lies open to the south, but is protected also by hills of gentle elevation to the east and the west—hills which are covered with rich verdure and with vineyards and fruit-trees. Soden is also celebrated for its roses, so that its pleasant gardens, green meadows, and shade-giving trees make it a most agreeable retreat; for it is much more of a retreat than German watering-places usually are. The houses are, for the most part, scattered about among the trees, and surrounded with gardens. The Kurhaus is in a sort of thickly wooded park, which almost conceals it from sight. From its protected situation the climate of Soden is essentially a mild one, the air is balmy and soft and still, though the close vicinity of the mountain-chain often causes a freshness in the evening air which is grateful and invigorating. But mildness of climate and equability are what characterise Soden, so that it is chiefly resorted to by those who need a soft and soothing air. It is possible there for invalids to spend much time in the open air with advantage, and this they often do, extended in hammocks suspended from the

branches of trees. It is found that persons with chronic catarrhal conditions of the throat and air-tubes, and cases of consumption that require soothing rather than bracing treatment, do well at Soden.

But it must always be borne in mind that it is a soothing climate. Cases, for instance, which require bracing are not suited to it. Cases of nervous asthma cannot breathe there, while the catarrhal cases do well. Soden has a great number of mineral springs, twenty-three altogether, and, although they vary scarcely at all in the nature of their ingredients, they vary greatly in their quantity and in their temperature. There are springs as strong as as well as stronger than those of Homburg and Kissingen. There are others which are as pleasantly mild as seltzer-water. One of these milder springs has been found of great use in cases of chronic bronchial catarrh. Soden possesses a conveniently arranged bath-house, where douches and all other varieties of baths can be given. The judgment pronounced by the celebrated French physician, Trousseau, many years ago, respecting the relative claims of Soden and Homburg, are as true now as they were then. "Soden," he says, "would compete with its more fortunate rival if its medicinal virtues alone were considered. It is neither less useful nor less favoured by nature; its waters contain the same ingredients and render exactly the same services as those of Homburg; and those who dread the artificial life of watering-places, and who need calm, must prefer the gentle and peaceful life of Soden to the more tumultuous pleasures of Homburg or Wiesbaden." But persons who need bracing treatment must not go to Soden.

THE CURANSTALT FALKENSTEIN.

Within three miles of Soden are the beautifully situate ruins of Königstein and Falkenstein. The Castle of Königstein is particularly fine—perhaps one of the finest ruins in Europe, especially when approached from the hill which separates the little town of Königstein from the village of Falkenstein. Here the grand and extensive old ruins are seen crowning an elevation to the west of the little town, and surrounded by the forest-clad hills of the Taunus.

In a beautiful situation on the southern aspect of the wooded hill to the north-east of Königstein, and just below the ruins of Burg Falkenstein, commanding a most extensive view in the direction of Frankfort, has been established a health resort of a somewhat novel kind, and of considerable interest and importance. It is the Curanstalt Falkenstein. It is an establishment intended chiefly for the treatment of consumptive patients, but cases of anæmia and of convalescence from acute diseases are also received. The medical director, Dr. Dettweiler, himself a sufferer from consumption, formerly assisted Dr. Brehmer, who was the first to establish a sanatorium of this kind at Görbersdorf, in Silesia. The principles of treatment are very simple, and so far they have proved successful in a fair proportion of cases. Dr. Dettweiler does not consider that the moderate elevation, about 1700 feet above the sea, has much to do with the results obtained, but that carefulness in small things is of chief importance. "Im kleinen gross," "great in little things," is his motto.

It is by the careful systematic regulation of everything that belongs to the daily life of the invalid—his food, his exercise, his repose, his occupations; by restraining his morbid caprices, his over-sanguine tendencies; by keeping a constant, firm, but kindly supervision over him, that Dr. Dettweiler obtains his good results. A judicious application of hydrotherapy, chiefly in the form of douches, and of electricity, and of all the resources, medical and general, which modern researches have proved to be useful, and all under the constant personal supervision of the resident physician—such is the system upon which the treatment of patients at Falkenstein is founded. Living for many hours each day in the open air is a primary consideration, and hammocks are swung from the branches of trees in the surrounding forest, in which patients can rest for several hours in the open air, and they assemble also in covered terraces with a southern exposure, where they sit in the open air whenever the weather does not forbid it. The situation of the establishment is admirably chosen for this purpose, the Taunus hills behind protecting it from the north, and gentler elevations shielding it from the east, and, in a lesser degree, from the west.

WIESBADEN.

Wiesbaden is one of the oldest as well as one of the most popular spas in Germany. Unlike most of the other spas, it goes on all the year round, having a winter season as well as a summer season. So Wiesbaden has grown to be a considerable town, and presents on that account many advantages to the invalid visitor. It has excellent hotels, and any number of lodging-houses of all kinds and of all prices, many of them handsome villas in pretty gardens. Education is good and not expensive, and the same may be said of its amusements. Wiesbaden is very proud of the excellence and cheapness of its amusements ; it has a theatre, which is one of the four or five in Germany which receive a subvention from the State, and it provides in consequence dramatic and operatic entertainments of a high order all the year round. An orchestra stall costs three shillings, and for eighteen shillings a-year one has unlimited access to all the resources of the Kursaal—library and reading-room, restaurant, concerts, weekly balls, etc. ; and one may drink any quantity of the Koch Brunnen into the bargain. Wiesbaden does not rely merely on its mineral springs to attract invalids into residing there ; it aims at a much wider sphere of usefulness ; it aims at providing nearly everything that all classes of invalids may require, so it possesses special resources for all kinds of special maladies. There are excellent establishments for the application of the water-cure, with douches, fine swimming-baths, etc. and for the application also of medical electricity. Milk-and-whey cures

are also provided, cows and goats being fed in a special manner for the purpose ; and the grape cure is also introduced in the autumn, the grapes being obtained from France on purpose. This is particularly recommended as an "after cure," after a course of the waters. In the year 1878 as many as eighteen thousand pounds of grapes were imported for this purpose. In one of the hydropathic establishments there are also compressed air baths. Wiesbaden is also well supplied with special medical skill in the shape of oculists, aurists, dentists, etc. so that it forms a sort of invalids' compendium ; while it lays claim to virtues as a winter climate which, it must be admitted, can scarcely be granted it as a summer residence. Surrounded on all sides by hills, except to the south, to which it lies completely exposed, it has the disadvantage of being very hot in summer during the daytime ; the early mornings and the evenings are, however, cool, for cold currents of air blow down into the valley from the Taunus mountains after the sun goes down. In many of the hotels, too, in summer the presence of mosquitoes becomes a serious plague.

In winter the climate of Wiesbaden is very healthy, and though it is really colder than in England—that is to say, the average temperature is lower—yet it differs from our cold inasmuch as it is accompanied by a dry, bright, and clear atmosphere. There is far more sunshine, and, from the protection afforded by the surrounding hills, much more stillness in the air, and although the temperature is lower, it is more equable, and the cold is, therefore, not nearly so much felt as in England and in other parts of Germany, and in certain parts of the town the abundance of the subterranean hot springs makes a distinct difference in the temperature of nearly 4 degrees Fahrenheit. Wiesbaden thus possesses many attractions as a winter residence for invalids and their families, not only on account of its climate and the medical resources to be found there, but also because of the agreeable life, the cheapness and excellence of its

amusements, and the educational facilities it affords. With regard to the springs at Wiesbaden, their virtues are widely known. Their chief characteristic is their high temperature, the Koch Brunnen having a temperature of 156 degrees Fahrenheit; and their chief constituent is, like so many of the neighbouring spas, common salt. Out of sixty-three grains of solid ingredients in a pint of the water fifty-two consist of common salt. There is nothing characteristic in the other ingredients, which are for the most part those generally found combined with common salt in other salt springs. The complaints which are said to be especially benefited by the Wiesbaden springs are those, in the first place, which fall under the category of chronic rheumatism, chronic gout and neuralgia, old rheumatic and gouty deposits, and thickenings about the joints, as well as muscular rheumatism, and of neuralgic disorders, sciatica in particular. If these can be cured at all, Wiesbaden, it is said, will cure them. Cases of paralysis due to chronic inflammation of the coverings of the spinal cord are benefited by the hot baths; so are diseases of the bones, and especially those resulting from gunshot injuries. Chronic ulcers of the skin and some forms of skin disease, such as eczema and scrofulous enlargement of glands, are appropriate to treatment at this spa as well as at other salt spas. It is generally believed that the high temperature of the baths is the chief special influence which is operative in the Wiesbaden cure, but most of the patients are expected to drink the water as well as bathe in it, and regarded as a drinking spring, other ailments must be added to the list of those already named, chiefly catarrhal conditions of the mucous membrane—e.g. chronic gastric catarrh, chronic intestinal catarrh (diarrhoea), and chronic bronchial catarrh; all these are said to be amenable to cure, or, at any rate, to great amelioration by drinking the Wiesbaden waters.

The routine of drinking begins at six a.m., and from that hour till eight the young women at the

Koch Brunnen are busily engaged in supplying the crowd of applicants for glasses of the steaming hot beverage, too hot to be drunk at a draught, so it has to be slowly sipped or allowed to cool a little before it can be swallowed. I suppose one must not object to the now universally accepted belief that the water of the Koch Brunnen tastes like chicken broth. I must, however, protest that the comparison would not have occurred to my unaided faculties. It has been recommended, and apparently with good reason, instead of drinking several glasses of the water at this early hour to take, say a glass and a half then, the same dose between eleven and twelve, and a third at five p.m.

The baths are taken either early in the morning or about an hour after breakfast, and patients are required, according to the case, to remain in the bath from twenty minutes to an hour, and a period of complete repose after the bath is earnestly enforced. The water is much too hot to be used as a bath as it issues from the springs, and it is therefore allowed to cool during the night, either in the baths themselves or in reservoirs connected with the bath-houses. The baths are all given in certain hotels and bath-houses, of which there are thirty altogether, containing eight hundred and fifty baths. These are for the most part in the neighbourhood of the hot springs. It is clear that little strict supervision can on this account be maintained over the bathing arrangements, so that this system lacks in some points what it obviously gains in convenience. It is undoubtedly an immense convenience, especially to those who are crippled by their maladies, to be able to get their baths in the hotels they live in. In some of these bath-houses, where the water is allowed to cool during the night in the baths themselves, and as the partitions between the baths are not complete, but only extend up for a certain height, the air of the bath-house becomes exceedingly hot and stuffy, unwholesome, and necessarily depressing. In one or two of the hotels better arrangements obtain for the ventilation of the bath-houses.

The baths are taken in the form of "full baths" and "douches." A "rain douche" of moderately cold water must indeed be an excellent method of refreshing the patient after half an hour in these hot baths.

The period of the cure must not be circumscribed by a hard and fast line. The typical twenty-one baths must often be extended to perhaps twice that number. The environs of Wiesbaden are exceedingly agreeable, and many beautiful walks and drives may be taken through the forests which cover the surrounding hills.

SCHWALBACH.

It is a pleasant drive of three hours from Wiesbaden to Schwalbach, over gently undulating ground and through pine forests covering the lower hills of the Taunus. It is a most refreshing change from the hot streets of Wiesbaden to the cool fresh air of these forest roads. On first reaching Schwalbach you see nothing but the tail of a long straggling village. This is the older part of Long (Langen) Schwalbach.

After passing through this you reach the new part of Schwalbach, the Curviertel, or modern *quartier*, which has quite a different aspect. This part is built on the slopes of two converging valleys, which meet at the Kursaal, and from this point the older village stretches away like a half-disjointed tail. The situation of the modern portion is certainly very pretty; many handsome villas crowd the wooded slopes of these northern declivities of the Taunus. Agreeable shady walks ascend through the woods in various directions, and the surrounding country affords a great number of most picturesque carriage excursions of almost any required distance. Although Schwalbach is nearly 1000 feet above the sea, it is much hotter than might be expected in a place of that elevation, owing to its being so much protected by the hills around, so that it becomes very hot in the floor of the valley during the middle of the day in the months of July and August. As the visitors to Schwalbach are for the most part anæmic ladies, the life there is, as may be imagined, very quiet, and devoted chiefly to drinking the waters and bathing in them. Until quite

recently Schwalbach did not possess a Kursaal, but since last year a handsome new building has been opened, which now affords its visitors all the resources found at neighbouring spas—a good dining-room and restaurant, reading and conversation rooms, billiard and smoking rooms, ball and concert rooms, etc. The hotels are good, and situated close to the springs and the bath-house, but many persons live in lodging-houses, which are numerous and good, and in some cases extremely moderate in price, so that living at Schwalbach is much cheaper than at most German spas. Schwalbach is especially an iron cure. It is *the* iron cure of Germany. It belongs to the class of simple iron springs in which the iron exists as the chief constituent, unassociated with any ingredients which can complicate or interfere with its action. It is one of the strongest and purest iron waters in Europe. It also has the advantage of possessing a very large proportion of free carbonic-acid, which makes it sparkling and pleasant to drink, increases its digestibility, and renders it valuable as a medium for bathing in. There are only two springs that are used for drinking—the Wein Brunnen and the Stahl Brunnen. The Stahl Brunnen contains about half as much again of iron as the Wein Brunnen and rather more carbonic-acid. There are many other springs, the water supplied by which is used for the baths, and others which are not utilised at all. Sir Francis Head, in his “Bubbles from the Brunnen of Nassau,” mentions that the Pauline, which is now never used for drinking, was the “fashionable Brunnen” in his time, and adds: “But as the cunning Jews all go to the Stahl Brunnen,” by way of getting the most for their money, “I strongly suspect that they have some good reason for this departure from the fashion.” The Jews were in the right; nobody drinks at the Pauline now.

The bathing arrangements at Schwalbach are good. The chief benefit of the bath being believed to consist in the action of the carbonic-acid which the water contains on the skin, it is so contrived that as little as

possible of this gas shall escape in the conveyance of the water to the bath, while the bath itself is of brass, and is provided with a double bottom. Between the two bottoms is a chamber, into which steam is conveyed for the purpose of heating the water to the required temperature. As the water in the bath becomes heated it gives off myriads of bubbles of carbonic-acid gas, and the contact of this gas with the skin is considered to have a beneficial effect upon the superficial vessels and nerves. There can be no doubt that the gas does exercise a distinct influence on the skin, which becomes red and experiences a diffused tingling sensation.

The course at Schwalbach is considered especially applicable to cases of bloodlessness, arising as a consequence of hæmorrhages, or of any exhausting disease, or in retarded convalescence from acute maladies; also in anæmia, so often associated with disturbances of the nervous system—hysteria, etc.—in these latter cases, the use of the tonic water, the soothing baths, and the calm, but, at the same time, cheerful surroundings of the place should exercise an undoubtedly curative effect.

Schwalbach is usually approached from Eltville, a railway and steamboat station on the Rhine, from which it is distant a pleasant drive of only nine miles, so that it is very accessible.

SCHLANGENBAD.

About midway between Eltville and Schwalbach is the beautifully situated bath of Schlangenbad. It is difficult to imagine a more picturesque spot for a watering-place than Schlangenbad—a winding valley, turning upon itself with a sharp bend, so that one end of the village is brought nearly on a line with the other, surrounded by high, richly-wooded hills, their lower slopes covered with scattered villas surrounded by flower gardens and bright green lawns—such is Schlangenbad. A pretty, quiet, peaceful retreat. It has a sort of miniature Kursaal, with shady walks and seats around, two or three nice clean hotels, and three bath-houses, one quite modern, where the patients can live in apartments, some of which are even elegantly furnished, at a fixed price, which is printed over the door of each room. On the ground-floor are the baths; these are extremely well arranged, and more comfortable, airy, and pleasant than those of any other German spa with which I am acquainted. Those in the modern bath-house are really luxurious. Reclining in one of those luxurious baths, the water, with its delicious softness and pleasant temperature, seems to envelop the whole body with a sort of diffused caress; while, from some peculiar property in the water, it gives a singular lustrous beauty to the skin, which seems to be suddenly endowed with a remarkable softness and brilliancy. It certainly tends to put one upon the best possible terms with oneself, and one can readily understand the calming influence which these baths are said to exert over irritable and disturbed states of the nervous system.

The reputation of the Schlangenbad water as a

cosmetic is widely spread, and large quantities are exported in bottles to Paris and St. Petersburg especially for toilet purposes.

Schlungenbad, 900 feet above the sea, belongs to the group of so-called "indifferent, earthy baths," and thus resembles Gastein, Pfeffers, and Wildbad; the natural temperature of the water ranges from 81 degrees to 86 degrees Fahrenheit; it is raised in the baths to from 87 degrees to 92 degrees. It is less stimulating than the same kind of water at higher temperatures, as at Teplitz and Gastein; and it is, therefore, more suitable to those sensitive organisations whose nervous systems above all things need a soothing treatment, and its comparatively slight elevation above the sea accords with this indication, for its climate is mild, though fresh and equable. The surrounding woods afford every opportunity for open-air exercise and lounging, and the quiet, yet pleasing life there makes this place the type of cheerful repose. A great authority on bathing-places says of Schlungenbad: "We know of no thermal bathing resort which produces such a calming and at the same time refreshing effect upon the invalid requiring gentle management. It has effected (in some cases) all that we should otherwise have expected from the remote and often rainy Gastein." Delicate ladies who suffer from hysterical and other forms of nervous excitability and exhaustion, and who need repose, are especially suited for this spa. Painful forms of spinal disease, with loss of muscular power, which are unable to bear the stimulating treatment of the thermal salt baths, are often soothed and benefited by treatment here. It is a little remarkable that there are not more cases of gout in irritable nervous subjects to be found here. Cases that do well at Buxton may fairly be expected to benefit at Schlungenbad, and it has the advantage over Buxton of greater warmth and a complete change of living; moreover, at Buxton it rains every other day! It is very accessible, being only five miles from the station of Eltville, on the Rhine.

KREUZNACH.

The last of those Rhenish health resorts that I have to notice is Kreuznach, in the valley of the Nahe, about ten miles from Bingen, on the left bank of the Rhine. It enjoys a pre-eminent reputation among salt baths for the treatment of all forms of scrofulous disease. Whatever diseases can be traced to a scrofulous tendency, or can in any way be identified or associated with scrofula, are regarded as suitable for treatment and likely to be ameliorated or cured at Kreuznach. The springs have been termed "bromioduretted," and they contain a certain very small amount of compounds of iodine and bromine; but those who are most familiar with their use and application place but little reliance on the presence of these compounds, and regard them rather as strong salt springs, which they fortify in a special manner and apply also in a special fashion.

The only spring used for drinking, the Elizabeth Spring, arises in Kreuznach itself, quite close to the Kursaal; but the other springs used for bathing are found at some distance from Kreuznach, especially at Theodorshalle, a mile off, and at Münster-am-Stein, two and a half miles distant. The Elizabeth Spring contains ninety-four grains of solid ingredients in a pint, and of these seventy-three grains are chloride of sodium; of bromide of magnesium there is rather more than a quarter of a grain, and of iodide of magnesium rather more than three-hundredths of a grain. Of chloride of calcium there is rather a large proportion—thirteen grains. This is the only spring used for drinking, and it is drunk first in small quantities, and

gradually increased to about a pint daily. It is not sparkling, as it contains no carbonic-acid ; but it is not very unpleasant to drink. It is chiefly, however, to the use of the baths that the physicians at Kreuznach trust for producing the good effects which they claim from the use of their springs ; and these baths are administered in a special manner. Most of the baths at Kreuznach are fortified by the addition of what is called "mother lye." This is prepared at Theodorshalle and Münster-am-Stein, in connection with the salt works at these places. Immense hedges of rough twigs and brambles are built up, and the water from the springs is allowed to flow over these, and by thus exposing a great extent of surface to the air, it becomes concentrated to a certain degree ; it is then collected and boiled in large pans, and after boiling it is kept at a high temperature for several days ; in this process the chloride of sodium for the most part is separated by crystallisation, and the liquor left behind, after further concentration, forms the "mother lye." This differs much in composition from the water of the springs from which it is derived. It is a yellowish brown, oily-looking liquid, containing but a relatively small quantity of common salt ; while the other chlorides, especially the chloride of calcium, are in larger amounts. It also contains an appreciable quantity of bromide of potassium. In one thousand parts there are three hundred and thirty-three of chloride of calcium, nearly seven of bromide of potassium, and fourteen of chloride of lithium. It is usual to add to a single bath about two litres of "mother lye," and two and a half kilos of common salt ; but this quantity of "mother lye" is largely increased in certain cases. In a bath of this kind the patients are retained for a long time, often for an hour, and a long period of repose is also needed after a prolonged bath of this sort. It produces much drowsiness and a feeling of exhaustion, and a considerable rest after it is essential.

Kreuznach is celebrated especially for the treat-

ment of scrofulous, glandular, and other enlargements, certain diseases of women, certain forms of skin disease, and certain forms of gout and rheumatism. The system pursued there is regarded as the typical mode of applying strong salt springs, internally and externally, for the relief of chronic maladies.

It has the advantage of possessing an abundance of springs, many of which belong to the salt works at Carlshalle, Theodorshalle, and Münster-am-Stein ; and the large supply of "mother lye" and the salts extracted therefrom, always at hand, enables the physicians to use baths and local applications of any degree of strength they may desire and for any length of time. Such local applications prove most efficacious in promoting the absorption of scrofulous and other hypertrophies and deposits.

The immediate surroundings of Kreuznach can scarcely be called picturesque. It is itself a dull uninteresting town ; but there are no doubt many interesting excursions in the neighbourhood, most of them, however, too distant for invalids. It cannot bear comparison for attractiveness with such baths as Homburg or Ems. Münster-am-Stein, two and a half miles higher up the river Nahe, also a bathing station, where the same mode of treatment is carried out as at Kreuznach, is much more picturesquely situated. It lies at the foot of precipitous red porphyry cliffs—one, the Rheingrafenstein, rising to a considerable height almost perpendicularly from the river, forms a grand object ; and another, the Gans, an indented ridge of porphyry, rises some two hundred feet higher, and commands a most extensive view of the valley of the Nahe. On the former there are some fine ruins of a castle which belonged to the Rhenish Counts, built in the eleventh century ; while opposite are the ruins of Ebernburg, once the residence of the celebrated Franz von Sickingen.

I may conclude these sketches of some of the principal watering-places in the Rhine district by a few general considerations more or less applicable to

all of them. It should be remembered that all these valleys, in which for the most part the springs I have been speaking of are situated, are generally during the months of July and August intensely hot, and exercise during the middle of the day is almost impossible; while, on the other hand, the months of May, June, and September have the advantage of being much cooler, while the hotels are not so crowded, and the difficulties attending life at a popular spa are reduced to the minimum. It is much wiser, then, for the English invalid to visit a place like Ems or Kreuznach in May or September than in July or August. There is another point upon which the spa doctors make complaint against our countrypeople, and I think justly. They say that an English patient will often come to them and say: "I have come here to be cured, and I must be cured in three weeks. I have no more time to spare, and my doctor in England tells me that that is long enough." Now, it should be borne in mind, that English patients who are sent to German spas are almost invariably the subjects of chronic diseases, maladies of long standing, and the object aimed at is often neither more nor less than to induce a change in the whole constitution, getting one's system to throw off, as it were, an inveterate habit, and it is not to be supposed that this can be accomplished in three or four weeks.

If those who have had a lifelong experience of a particular process of treatment tell you that little or no good can be obtained from less than a stay of six weeks, cheerfully accept your fate and stay, or give it up altogether.

Another point that cannot be too strongly insisted upon is that the patient should make some inquiries into the sanitary state of the place he or she proposes to stay at, more especially if it is intended that any of the younger members of their families are to accompany them. Germany is too poor, as one of the physicians I encountered told me, to be able to put all her bathing resorts into perfect sanitary condition; and if by

chance disease of a contagious nature is introduced from without, there often exist the precise conditions most favourable to its spread. The outbreak of typhoid at Homburg was traced to one particular hotel, and to the drinking of water from one particular well there, and now this town is likely to be put into a better sanitary state than many of its fellows. In one of the places I visited one of the local authorities told me there had been sixty cases of diphtheria, with ten deaths, in the schools there during that season. It is always easy to send a few plain questions to one of the physicians of a Continental spa and ask for clear and direct answers to them. It should scarcely be necessary, yet I fear it still is so, to insist upon the impropriety of drinking the water, especially that put in the bedrooms, in these as well as in the other resorts. Whatever care may be taken with regard to the water put on the table, one can never be sure what water a careless housemaid will give you to drink in your bedroom. So many ladies drink nothing but water that it is better to be provided with the means of boiling water and then mixing it with a little fruit syrup, or making it into toast and water, and so escaping the fearful penalty that occasionally follows the drinking of impure water.

One must be prepared also to find life at a fashionable German spa somewhat expensive, particularly if one lives in a large hotel; but if one feels independent of hotel society and contemplates a prolonged stay, it is much less expensive to take an apartment in one of the furnished houses which abound at these places, and get one's dinner at the Kursaal or elsewhere. Many small comforts can be provided in a lodging-house at very little expense, which are charged very highly for at the best hotels. In all the principal German spas life is made very easy, although it may be somewhat monotonous. At the Kursaal and elsewhere good food and refreshments can always be obtained at moderate prices. There is no lack of amusements of a certain kind, and those who are content to lounge about in

gorgeously decorated and luxuriously furnished apartments, or in pleasant gardens and parks, will find that a subscription of a few shillings will obtain them the entire range of such luxurious establishments as one finds, for instance, at Ems, or Wiesbaden, or Homburg. Then it is no small thing to many that good music is to be heard at most of these spas twice, sometimes three times in the day ; and there are few places where good lessons cannot be obtained, at quite moderate prices, in music and languages.

CHAPTER VII.

WINTER QUARTERS.

A STUDY OF WINTER HEALTH RESORTS.

La terre est son médecin ; chaque climat est un remède. La médecine, de plus en plus, sera une émigration, une émigration prévoyante.—*Michelet*.

AGAINST the many privileges which are said to be exclusively the lot of an Englishman must be set off the obvious disadvantage that he has to live in a climate which, for a great part of the year, is often little short of detestable. So long as he remains strong and well, he usually contents himself with grumbling, and adopts (or sometimes does not adopt) such artificial means of protection as his intelligence and experience show to be useful and necessary. But if he inherits, or acquires accidentally through disease, a feeble and ailing constitution, then too frequently he falls a victim to the rigour and inclemency of the external conditions to which he is exposed ; or, if he is both wise and rich, he follows the example of the migratory tribes of the animal kingdom, and seeks at each recurring season those conditions of climate which to him, as well as to them, are the conditions of life and comfort.

But we should be unjust and short-sighted if we failed to see any compensatory advantages in this climate of ours which we so often abuse. Many of

the best qualities of an Englishman are, to a great extent, due to the character of the climate of the country he inhabits. His capacity for endurance, and for adapting himself to varying conditions and circumstances, his energy in overcoming difficulties, his physical strength, are in some measure the outcome of his lifelong contest with unfavourable external conditions, and of those out-door exercises and sports to which he is driven in order to keep the blood actively circulating through limbs which would otherwise be chilled and benumbed ; or to keep his mind free from the melancholy and depression which inactivity under a leaden sky most surely induces.

The return of every winter necessarily brings to many minds the consideration, where they can pass the next five or six months with the least inconvenience and the greatest benefit to their healths. To the too numerous victims of pulmonary consumption, as well as to those who fear to become so, it is a question of the greatest import ; and not to those alone, for increasing experience of climatic conditions and influences shows that a vast number of other chronic maladies acquired in this climate are stayed in their course, and not infrequently altogether arrested by judicious change to more favourable external conditions. A few general considerations, therefore, as to the facts and principles which should guide us in the choice of a winter climate may not be uninteresting or unprofitable.

It would be unwise within the limits of a single chapter to hamper oneself with any attempts at a strict classification, while an exhaustive survey of the whole series of winter health resorts would be, of course, impossible. It will be better to confine our consideration to those which are tolerably accessible, and especially to such as recent inquiries have brought more prominently before us. I have, in another chapter, entered fully into this question of the utility and scope of high mountain health resorts in winter, and especially of that portion of the question in which

the public are beginning to take a great interest, the relation of those elevated regions to the cure of pulmonary consumption. It is interesting, however, to notice that in the first volume of the "Fortnightly Review," i.e. seventeen years ago, an article is to be found which foreshadows this discussion. "In cold climates," says the writer, "on the contrary, consumption is almost unknown. In Iceland it is seldom seen; in Greenland a case is the exception, and in more northern regions it disappears altogether. In mountain ranges above 3000 feet it is an exceptional complaint. Heat is favourable to the development of the disease, especially when accompanied by moisture."*

The discussion in this country has, during the last two or three years, been almost limited to the examination of the merits of *one* health resort, viz. Davos in the Grisons. Twelve years ago, when I first examined the subject, and when I first visited Davos and the Upper Engadine, it was the latter place that was chiefly in the minds of English physicians as a possible winter sanatorium for consumptives. Davos was then resorted to almost exclusively by Germans and Swiss. But the Upper Engadine does not appear to have maintained its position as a winter station. A writer in the "Fortnightly Review," speaking from an intimate personal experience of the Engadine for many years, and who certainly could not be accused of any prejudice against the place, thus speaks of his own observations of the residence of consumptive patients there :

It is well known that, in the treatment of such cases, medical opinion has undergone a change, so astounding as to look like a leap in the dark, or, at least, in the dim twilight. As the remedial agent, the extreme of dry cold has suddenly replaced the extreme of moist heat; and some patients who, only twenty years ago, would have been more or less boiled in Madeira, are now frozen on Alpine heights. How far has this bold experiment succeeded? In the Engadine, certainly, the

* "Dangers of Madeira." "Fortnightly Review," vol. i. 1865.

results (so far as they go) have not been encouraging. Out of the very few who, within my knowledge, have spent winters (or parts of winters) there, at least six have died—a startlingly large portion of the entire number; whereas consumptive cases where the cure of certain disease is itself certain and certainly due to the Engadine winter, are—I will not say unknown—but exceedingly rare. But, on the other hand, there are consumptive patients whom the air seems to have kept alive, and who are, though not well, quite well enough to enjoy life.

This evidence was of great value, coming as it did from one who had, during a series of years, followed with interest the histories of the consumptive invalids he had met in the Engadine, biassed by no medical predilections, but as an earnest and honest advocate of that place as a health resort, in such cases as it had appeared to him to be of use.

Now it is not a little remarkable that, while the Engadine at an elevation of 6000 feet (speaking in round numbers) has failed to acquire a reputation as a winter station for consumptive patients, although introduced to our countrymen on high authority more than twelve years ago, Davos, its near neighbour, not more than twenty miles distant, at an elevation of 5200 feet, should have grown with us into sudden and rapid popularity. I must, however, content myself now with merely mentioning these high mountain valleys as winter health resorts, as I have already dealt with the interesting and important question of the applicability of high altitudes to consumptive patients in a former chapter.

So without dwelling longer at present on this question, I pass on to the consideration of other winter resorts. The climate of Egypt resembles in some respects the climate of those high mountain valleys. It is dry and exhilarating, and it presents a wide range between the day and night temperature, depending upon the powerful heating effects of the sun's rays during the day, and the great and rapid radiation of the heat absorbed during the day, after sunset, into clear cloudless space. The climate of Upper Egypt is, however, on the whole a more

reliable climate than that of any high mountain valley, and less subject to variations; while the interest of the voyage up the Nile, and the diversions which it presents, render it a much more suitable resort for those who dread *ennui*, or who need occupation as well as relaxation for the mind.

The objections to Egypt are, of course, its distance, and the expense attending the journey; and, moreover, whichever route you select, it is impossible to avoid a sea voyage of at least three days. The objections to this, as well as to other sea voyages, are forcibly put by Mr. Flower:*

The principal objection to persons in delicate health undertaking a long sea voyage is the uncertainty about the influences to which he or she may be exposed; while on land, the traveller is, to a great extent, his own master, and has power to control the surrounding conditions. He may regulate the day's journey, according to strength or inclination, he may linger in such places as have agreeable associations and environments, he may hasten over those of an opposite character; but when once embarked upon a voyage, whether he find himself crowded in a dark close cabin, with two or three uncongenial companions, lying on a narrow hard shelf, port-holes rigidly closed, and the atmosphere he breathes poisoned by noisome odours, of which the sickening smell of the oil of the engines is one of the least objectionable; the rain pouring on deck, making escape from his prison, even for a few minutes, impossible; when he feels he would give all his worldly possessions for a breath of pure air, or a few hours' cessation from the perpetual din of the engines within and the waves without; he is perfectly helpless, he must go through it, day after day, and night after night, until the weather changes or the voyage is ended.

There is only one period of the year when Egypt is ever visited by the European as a health resort, and that is from the middle of November to the beginning of April, when it is considered to have the "finest climate in the world." There are several routes from England to Egypt. The shortest and most convenient is that through Italy to Brindisi,

* "Notes of Experience in Egypt," by W. H. Flower, F.R.S. "British Medical Journal," September and October, 1874.

and there is now, on one day in the week, a saloon carriage attached to the train at Calais which goes through to Brindisi. In this way the journey to Egypt is accomplished in six days. The longest is that by P. and O. boat from Southampton, which takes thirteen days. In returning, it is important for invalids with lung disease to bear in mind that it is not safe to return by the Southampton route, as the transition from the climate of Egypt to that of England is too abrupt. It is very important to leave Egypt before the heat becomes too great—i.e. not later than the middle of April—and it is undesirable to return to England before June. The interval may be conveniently spent in a variety of places of great interest, such as Syria, Italy, Greece, or some of the islands of the Mediterranean.

The chief characteristic of the climate of Egypt is its dryness.

In the richly wooded districts of the equatorial regions of Africa [writes Mr. Flower], where the numerous affluents of the Nile take their rise, almost continuous rains prevail; but in the deserts of Nubia and Upper Egypt, through which the great river flows in its course to the sea, sometimes years pass without a single shower. The absence of rain and absence of vegetation are obviously related to one another. The Mediterranean coast and the Delta are less dry than the upper parts of the country, and Cairo occupies an intermediate position.

We have the authority of the same writer for the statement that in an exceptionally wet season there were only eleven days out of one hundred and fifty in which rain fell, and on some of these it was scarcely more than a few drops. The days, as a general rule, are much like one another, fine, clear, bright, and sunny, and "the subject of the weather, so important to us in our island home, soon loses all interest, owing to the absence of change." Another of the characteristics of the winter climate of Egypt is the warmth or heat of the day (70 degrees to 75 degrees Fahrenheit in the shade), as contrasted with the coldness, freshness, and heavy dews of the nights. In the

night the thermometer often falls to 40 degrees or lower, seldom quite to freezing-point, so that there is a very considerable range between the day and night temperature. It has been justly observed that this is an advantage to many constitutions—that a sultry night following a hot day often induces languor and depression, and that the freshness of the Egyptian night and early morning is invigorating and bracing, and enables one better to bear the fatigues and heat of the day. Persons with delicate chests must be careful to protect themselves by appropriate clothing, and by retiring before nightfall, from the sudden change from the day to the night temperature, which they may otherwise find trying or injurious. The air of the Desert—that is, all the country above the level of the autumnal overflow of the Nile—is universally admitted to be most invigorating: a refreshing breeze, in winter at least, generally tempers even the heat and glare of the midday sun, and in the morning and evening it is decidedly cool. Nowhere on land is air so pure, as nowhere else is there such complete absence of all decomposing organic matters in the soil; it has been well compared with that of the open sea.

Most of those who go to Egypt for the winter, go with the intention of making the Nile voyage; but a winter may also be passed agreeably and advantageously at Cairo, or at Ismailia, as well as on the Nile. The thing of chief importance is to breathe as much of the Desert air as possible. It has been objected to Cairo that the hotels and all the modern houses are built on low ground that, until reclaimed, used to be subject to the overflow; and that the whole of the ancient city, with its crowded population and filthy streets, is between them and the Desert; that the prevailing winds, being from the north, blow directly across the Delta. "This, and the great amount of not very clean dust which fills the air of a great city full of people and animals, form the principal drawbacks to Cairo as a residence for invalids." An alternative

presents itself in a place fifteen miles south of Cairo, and three miles from the east bank of the Nile, named *Helouan les Bains*, on account of the existence there of a warm sulphur spring. This station, of which I have received most satisfactory accounts from patients who have stayed there, possesses a good hotel with a medical director who speaks English; and as it is in the open Desert, only a few miles from Cairo, and therefore very accessible, it ought to become popular with those who need to live in the winter climate of the Egyptian Desert, and yet who may not, for many reasons, be disposed to enter upon the Nile voyage.

Ismailia is quite a new town, with good sea-bathing, distant nine hours by rail from Cairo. It has been reclaimed from the Desert, is laid out with pretty gardens, and to the advantage of pure Desert air offers great quiet to those who love repose, while the constant passage of vessels through the Suez Canal relieves it from monotony. Of the Nile voyage little need be said in the way of description.

It is [Mr. Flower says] a perfect rest from nearly all the little cares and troubles of the world; the weather is almost always fine, so that nearly the whole day may be spent on deck, and the variety and exercise of a walk on shore can generally be got at some time or other in the twenty-four hours; the life on board a dahabeeah is generally a healthy one. It is essentially an out-of-doors country life. The air, though perhaps not equal to that of the higher parts of the Desert, is pure and bracing; for, owing to the narrowness of the strip of fertile land on the sides of the river, the air is practically that of the Desert. On the first subsidence of the water, after the autumnal overflow, the banks are muddy and damp, so it is well not to take to the water until December, by which time they are well dried by the sun, though January, February, and March are the best months. The higher the river is ascended, so the salubrity increases. The nights are generally clear, bright, and cool, and warm clothing is essential, as no artificial heat can be obtained on board the boat.

Egypt as a winter resort has, then, the following advantages: 1. It is almost rainless; at Cairo five or six showers would be the average in the winter. 2. It has a generally dry and clear atmosphere; attended,

it is true, with great changes of temperature in the twenty-four hours, a circumstance which proves invigorating rather than otherwise, if the invalid is careful to protect himself from the sudden fall of temperature at sunset, as well as through the cold nights. 3. Extreme cold is excessively rare. The mean winter temperature at Cairo is about 58 degrees Fahrenheit, and it rarely falls below freezing-point. 4. Its climate allows of constant exercise in the open air, and exposure therefore to the tonic effect of fresh air and sunlight.

The climate of Egypt then is tonic and stimulating, and it is useful in a great variety of chronic ailments, the chief of which are the following: It is said to be especially useful in cases of phthisis in scrofulous persons, those cases of phthisis which have a tendency, even in this country, to run a very protracted course; it is helpful, too, in most other forms of scrofulous disease; it is of value in gout and rheumatism, and especially in certain important visceral changes which gout induces; catarrhal conditions find their relief and cure here as well as in the cold dry air of high altitudes, so that cases of chronic bronchial, laryngeal, and pharyngeal catarrh get well in Egypt, as do also some cases of catarrhal asthma. Persons suffering from exhaustion of the nervous system from too great excitement, worry, or undue application to business or study, are precisely the cases for the Nile voyage. The same may be said of those numerous cases of intractable dyspepsia associated with hypochondriasis or hysteria.

The climate of Egypt is not limited simply to the relief of early phthisis, but advanced cases often do well there, though it is considered inexpedient that they should venture on the Nile voyage or go beyond Cairo. Cases of phthisis with a tendency to rapid progress in irritable or highly nervous constitutions must not, however, be sent to so tonic and exciting a climate.

I purposely pass in the next place to the con-

sideration of a winter climate, the characteristics of which are in striking contrast to those of the two preceding. The tonic and stimulating climates of Davos and Upper Egypt on the one hand, and the soft soothing climate of Madeira on the other, may be regarded as at the two extrêmes of winter health resorts for European invalids. Madeira having been for many years greatly overrated, has, during the last few years, come to be vastly underrated. It has suffered from one of those violent oscillations of medical opinion to which all health resorts are liable; and after such an acute disturbance we may take it for granted that it will be long before a rational equilibrium is established. It is however satisfactory to see that Madeira is again becoming resorted to in increasing numbers.

Writing of Madeira, Dr. Lambron, of Luchon, calls it "*La première résidence hivernale du monde.*"* The late Dr. Andrew Combe wrote: "*If I must go abroad, I shall most likely return to Madeira, on the simple ground that, if I must forego the pleasures of home, it is better to resort at once to the most advantageous climate,*" etc. A certain Dr. Heineken, according to a writer in the "*Fortnightly Review*"† already quoted, was said to have lived there with a quarter of a lung for nine years! But since the comparative want of success which attended the action of the authorities of the Brompton Hospital in the winter of 1865, the reputation of the island as a winter sanatorium for consumptives has been on the decline. The Brompton Hospital sent twenty carefully selected cases of phthisis to winter there; of these, two only were greatly benefited; seven improved slightly, six returned no better nor worse than when they left England, four returned worse, one died in the island. It is, I believe, sufficiently well understood now that the climate of Madeira is only suited to a very limited and carefully selected class of cases; but to the proper case it is a

* "*Choix d'une résidence d'hiver.*"

† "*Dangers of Madeira.*"

climate of the greatest utility. If we bear this fact in mind, we shall be able to reconcile the wide discrepancies which we find in authoritative and evidently unprejudiced statements about this island. Madeira is the type of what is termed an oceanic climate, i.e. a climate essentially soft and equable. It is also moist and sedative, and, no doubt, to persons with considerable constitutional vigour, it seems relaxing and depressing. But to certain persons in a state of profound debility, with much feebleness in the organs of circulation, in cases of irritative chronic bronchitis, and emphysema, in some cases of advanced consumption, and particularly those complicated with repeated attacks of bronchitis, even cases that have seemed quite hopeless, a prolonged residence in the climate of Madeira has been attended often with most remarkable amelioration. ✓ The feeble flickering lamp burns longer there than in a more stimulating and tonic air, and now and then it seems to gather renewed power and burns up again with some of its old lustre. Madeira has had a great and not altogether undeserved popularity in the past, and it will, I doubt not, have a more stable, because more discriminating, popularity in the future.

Climate resorts have been classified roughly into Continental climates, i.e. those in the interior of continents—Upper Egypt may serve as an example; Oceanic climates, places situated in the open sea, as Madeira; and Littoral climates, or places on the sea-coast.* I propose to take, as my first example of a coast climate—and these climates, from their great popularity and importance, must necessarily occupy a considerable share of my attention—one which has quite recently been introduced to the notice of the British public as being of extraordinary value: I allude to Mogador, on the Atlantic coast of Morocco, and nearly in the same latitude as Madeira. A French physician, Dr. Thenevin, quoted by Lombard

* The physical causes of the characteristics of sea and coast climates I have explained at some length in another chapter.

in his "*Climatologie Médicale*," has resided there for many years, and it is mainly owing to his careful observations that the peculiar salubrity of Mogador has been made known to the medical profession. For the following details about Mogador and its climate I am, however, indebted to Hooker and Ball's admirable work on "*Morocco and the Great Atlas*." * Mogador, they say, is the last outpost of civilisation on the African coast at this side of the French settlements of Senegal. A low rocky island lies opposite the town, separated from it by a navigable channel, and affords shelter from all winds, except those of the south-west. The town is, in one respect, the most habitable in Morocco, being remarkably clean, and, in that respect, superior to many seaports in Europe. The narrow but regularly built streets contain houses mostly of two storeys, inclosing a small courtyard, which is entered by a low and narrow doorway from the street. In the Moorish town, inhabited by natives of the lower class, the houses are of one storey, and poor in appearance; but the practice of whitewashing within and without once every week makes them look clean, and, no doubt, has much to do with the remarkable immunity of the place from contagious and epidemic diseases. Its surroundings are not prepossessing. The low tertiary limestone rock on which it is built is covered up to the city walls with blown sand, driven along the shore before the south-west wind, forming dunes that cover the whole surface; and in most directions one may ride two or three miles before encountering any other vegetation than a few paltry attempts at cultivating vegetables for the table within little inclosed plots, whose owners are constantly disputing the ground with the intrusive sand. Regarded as a sanatorium for consumption, Dr. Thenevin bears testimony to the following facts: Phthisis is all but completely unknown among the inhabitants of this part of Africa; while in Algeria

* Published by Macmillan and Co., 1879.

cases are not rare among the natives, and in Egypt they are rather frequent. In the course of ten years he had met but five cases among his very numerous native patients, and in three of these the disease had been contracted from a distance. He had seen, moreover, several cases among Europeans, who had arrived in an advanced stage of the disease, on whom the influence of the climate had exercised a remarkable curative effect. The observations of M. Beaumier, especially those for temperature, may help to explain these facts, as they certainly show that Mogador enjoys a more equable climate than any place within the temperate zone as to which we possess accurate information. These are a few of the results :

			Fahr.
Mean temperature during eight years	.	.	66°09'
" " for hottest years	.	.	68°65'
" " for coldest years	.	.	65°75'
" of the annual maximum	.	.	82°05'
" " minimum	.	.	53°00'
Highest temperature observed	.	.	87°08'
Lowest " "	.	.	50°07'

More striking still is the comparison between the temperature of summer and winter. The following results show the monthly mean temperature, derived from eight years' observations :

Summer	{	June . 70°8'		Winter	{	December . 61°4'
		July . 71°1'				January . 61°2'
		August . 71°2'				February . 61°5'

Showing a difference of only 10 degrees Fahrenheit between the hottest and coldest months. It has not been possible to ascertain accurately the daily range of the thermometer, as there were no self-recording instruments employed ; but there is reason to believe that this would exhibit a still more remarkable proof of the equability of the climate. So far as observations go, they show an ordinary daily range of about 5 degrees Fahrenheit, and rarely exceeding

8 degrees. A comparison of the climate of Mogador with that of Algiers, Madeira, and Cairo, which have nearly the same mean winter temperature, will show that the mercury is occasionally liable to fall considerably below 50 degrees, and that the summer heat is greatly in excess of the limits that suit delicate constitutions, the mean of the three hottest months being about 80 degrees Fahrenheit at Algiers, about 82 degrees at Funchal, and 85 degrees at Cairo.

Rain falls at Mogador, on an average, on forty-five days in the year; and out of one thousand observations on the state of the sky, the proportions were—clear, seven hundred and eighty-five; clouded, one hundred and seventy-five; foggy, forty; the latter entry referring to days when a fog or thick haze prevails in the morning, but disappears before mid-day. The Desert wind is scarcely felt there. On an average it blows on about two days in each year, and then has much less effect on the thermometer than it has in Madeira, owing, no doubt, to the protective effect of the chain of the Great Atlas. These remarkable climatic conditions have been mainly attributed to the influence of the north-east trade wind, which sets along the coast and prevails throughout a great part of the year; the average of the north and north-east winds being about two hundred and seventy-one days out of three hundred and sixty-five. The great Atlas chain, with its branches that diverge northward towards the Mediterranean, screen the entire region from the burning winds of the Desert, and send down streams that cover the land with vegetation. There are not half-a-dozen days in the year that may not be spent agreeably out of doors. Some of the salubrity of the climate may possibly be due to the circumstance that the N.N.E. winds come saturated with vapour, and charged with minute particles of salt from the breaking of the Atlantic waves on the reefs near the town. There is a competent resident French physician. The

chief drawbacks, at present, would probably be in respect of the food supply, certain comforts necessary for invalids, and society. It may be that Mogador is destined to succeed to the renown, as a sanatorium for consumption, once possessed by the adjacent island of Madeira. The best known health resort in Morocco, however, is Tangier, and as it is only thirty-five miles from Gibraltar, from which place it is reached in three hours by steamer, and as it is known to possess a very fine climate, it is somewhat to be wondered at that it has not become more popular with Europeans. But, as Messrs. Hooker and Ball observe in the work from which I have already largely quoted, Morocco, though a country close to Europe, is among the least known regions of the earth. "Nothing is more rare," they remark, "than to find a country where neither the natives nor foreign visitors have any complaint to make against the climate, and in that respect Morocco is almost unique." Tangier has rather a large annual rainfall, thirty inches, but it falls principally at one season, and that is in October and November. In the winter and spring the air is usually delightfully clear and bracing, and the daily temperature remarkably equable, the thermometer in the shade during the day ranging from 60 to 66 degrees Fahrenheit. It would seem, in the case of Tangier—as, indeed, must be the case in sea voyages—that humidity of air under certain conditions is no drawback to salubrity,* for on

* Hooker and Ball make the following judicious remarks on this head: "To the human body there is nothing unpleasant in the effects of such air (at a temperature of 75 degrees to 85 degrees) when nearly saturated with vapour, and so long as the temperature remains habitually between 70 and 80 degrees it is decidedly favourable to health. . . . Air at 50 degrees Fahrenheit cannot at the utmost carry more than about four and a half grains of aqueous vapour to the cubic foot; but at that temperature it produces, when nearly saturated, that feeling on the nerves of the skin, familiar to every inhabitant of this island, which is the ordinary forerunner of colds, sore-throats, rheumatism, etc."

this part of the Morocco coast "the breezes, whether they travel eastward from the Atlantic, or westward from the Mediterranean, are laden with aqueous vapours nearly to the point of saturation, and nothing dries spontaneously by mere exposure to the air."

The town of Tangier is built on rocky ground, rising steeply from the shore to the west of a shallow bay, and behind it to the westward rise undulating hills stretching up to the Djebel Kebri, or Great Mountain. From the hills to the west of the town magnificent views are obtained, including the Mediterranean, the Straits of Gibraltar, with "its double stream of vessels of every size and every nation," the coast of Spain, and the chain of mountains stretching towards Malaga. On the eastern side of the bay the shores are low and sandy, but backed by the "rugged range of the Angora Mountains, culminating in the Apes' Hill opposite Gibraltar." The city is surrounded by zigzag walls on all sides, and entered by three gates, which are closed at nightfall. "The main street is as rough and steep as the most neglected of Alpine mule-tracks, and disfigured by heaps of filth; importunate beggars of revolting aspect, led about by young boys, assail one at every step; the miserable shops are mere recesses, where, in an unglazed opening, little larger than a berth in a ship's cabin, the dealer squats, surrounded by his paltry wares." But, "unlike the towns of Southern Europe, where the main thoroughfares are cared for by the local authorities, while filth is allowed to accumulate in the byways, the dirt and offal are here let to lie under one's nose in the most public places, while the steep narrow lanes that intersect the masses of closely-packed houses are generally kept clean and bright with perpetual whitewash."*

Tangier contains a good hotel, the Royal Victoria, recommended for its cleanliness and comfort, and kept

* Hooker and Ball's "Morocco and the Great Atlas."

by a very civil coloured proprietor, Mr. Martin. Its admirable climate is marred somewhat by the drawbacks of dirt, bad smells, and the complete absence of roads, and it is only in the immediate neighbourhood of the town that Europeans can safely walk or ride without an escort. "We carried away from Tangier (Hooker and Ball) the impression that even on the Mediterranean shores there are few spots that combine such advantages of climate, natural beauty, and material comfort."

Algiers will commend itself to many who are in search of winter quarters. It will commend itself to those who have "done" Egypt, who are weary of the Riviera, and who do not dread a passage of forty or more hours across the Mediterranean. The touch of Oriental as well as modern military life there, the great interest of the town itself, as well as the variety of interesting excursions in the neighbourhood, the gaiety and vivacity of the French settlement—these are decided attractions for many of those who have to spend each recurring winter out of their own country. The journey is not a long one, and good steamers leave Marseilles on the Tuesdays and Saturdays of every week, and profess to accomplish the crossing in thirty-six hours; passing by the islands of Minorca and Majorca on the road, it is a pleasant enough voyage in fine weather. But for those who suffer much from a sea voyage, there is scarcely enough in the climate of Algiers to compensate them for their sufferings. Algiers has its admirers and its detractors, which may be taken to prove that it has its bad seasons and its good seasons. There are discrepancies, too, in the different accounts of the mean annual rainfall, one giving it as twenty-eight inches, another as thirty-six; so with regard to the average number of rainy days in winter, one author making it forty-two, and another seventy-two; so also with the mean winter temperature, estimated by one observer at 62·13 degrees Fahrenheit, and by another as 57·2 degrees. There can be no doubt, however, that much rain falls during

the winter months at Algiers ; but authorities differ even as to which are the wettest months ; one (*"Encyclopædia Britannica"*) says December and January, another (Murray) says November and February, and a third (Scoresby Jackson) November, December, and January. All, however, seem agreed that March and April are the best months. The winter temperature of Algiers is, on a general average, about 10 degrees Fahrenheit higher than that of the Riviera, and 18 to 20 degrees Fahrenheit higher than in England. The difference between the day and night temperature is not so marked ; but as soon as the sun sets the air often becomes highly charged with moisture. The thermometer very rarely descends to the freezing point ; one observer found it only do so twice in twelve years. Although the winter rainfall is so considerable, the climate is said to be the reverse of damp and relaxing, for a rainy day in Algiers may simply mean a heavy shower of half an hour or an hour's duration, and as soon as the shower is over the invalid can take exercise again in the open air ; and it may be worth bearing in mind that in a large city like Algiers, these occasional heavy falls of rain serve to wash the air and keep it free from the accumulation of impurities due to organic emanations from men and animals. But I have heard of winters in Algiers when the rain fell in great quantity, "nearly daily, and often all day," in the months of November, December, January, and February. The prevailing wind is the north-west, a "cold and dry wind," blowing across the Mediterranean. The Sirocco blows but seldom, perhaps for three or four hours during four or six days in a month ; but it is excessively disagreeable while it lasts, for, coming across the great desert of Sahara, it is laden with a fine penetrating dust, and feels hot and burning like a blast from an oven. The climate of Algiers, less exciting and milder, and more equable than that of the Riviera, is not humid and relaxing like Madeira ; it seems, therefore, capable of exercising a tonic and bracing

influence in many cases of chest disease, as well as in other chronic maladies. This kind of combination of tonic and sedative climatic influences is peculiarly suitable to cases of early phthisis in somewhat feeble, lymphatic constitutions, or in cases where the existence of nervous irritability or excitability would counter-indicate a residence in the Riviera, to the various health resorts of which I must now hasten to give a brief consideration.

The beauty and accessibility of the health resorts of the Riviera will always make them popular with those, whether they be invalids or not, who desire during the winter to exchange a clouded sky for a cloudless one, and the confinement of their own rooms for free sunlight and sea breezes. Not that the climate of the Riviera is by any means a perfect one. It has a heavy rainfall and a fair number of rainy days; the transition from day to night temperature is sudden and considerable, damp and chill evenings succeeding to hot and dry days; it can, and does, freeze there, though not often; it is tormented by some of the fiercest and most disagreeable winds that blow, and in some parts, as e.g. Nice and Hyères, clouds of dust make life at times a burden. Yet, notwithstanding all these drawbacks, the Riviera has many recommendations, as we shall presently see. Its position with regard to the chain of the Maritime Alps gives it almost complete protection, especially its western portion, from the north; and to this and its southern exposure, and the relative warmth of the Mediterranean,* it owes its warm climate, for its mean temperature is from 8 degrees to 9 degrees Fahrenheit higher than that of England. Though the rainfall is

* Dr. Marcet, of Cannes, has shown that the temperature of the surface of the Mediterranean at Cannes is from 5 degrees to 9 degrees Fahrenheit higher than it is on the west coast of Cornwall, and he concludes "that the temperature of the air near the Mediterranean must derive a considerable accession of heat throughout the winter from that which is stored up by the water during the summer."

great—for instance, at Nice, there is nearly twice as much rain falls during the winter months as in London—yet there are fewer rainy days, for during the same period there are eighty-nine rainy days in London to thirty-six at Nice. The rain falls in heavy torrents for a short time, and then there is no more rain for days ; while as to cloud, we find also in the same period, that whereas London has only twelve cloudless days Nice has ninety-seven. Then, as to relative humidity of atmosphere in winter, if we compare Cannes and London, it is (estimated roughly) as seventy-five to ninety. It must be remembered, however, that the Eastern Riviera has a much larger rainfall and more rainy days than the Western. At Genoa one-third more rain falls in the winter than at Nice, and nearly twice as much as at Hyères, and it has nearly twice as many rainy days as Hyères, and a third more than Mentone or Cannes. The greatest rainfall is in October, then November, December, and March, and the smallest is in February. There are, of course, here, as everywhere else, quite surprising variations in different years.

Owing to the general prevalence of land winds, the air is much drier and more exciting than that of littoral climates generally. The north-west wind, or Mistral, is an exceedingly dry cold wind, as it parts with all its moisture in traversing Central France. It is more felt in the western towns than in those east of San Remo ; it blows with greatest violence in March, and is exceedingly hurtful and unpleasant both to sick and sound ; it blows, also, frequently with much violence in April, and once or twice in each of the other winter months. The Sirocco, the hot enervating Sirocco, coming from Africa, blows chiefly in the spring and summer, and often, also, for two or three days in the winter months ; it appears not to be a moist wind, as stated by some, but to be usually followed by rain. The north-east wind, or Greco, is felt most severely and frequently along the Eastern Riviera, and gives to the climate of Genoa its peculiar

bleakness. "It is a biting cold wind, often accompanied with sleet, hail, or snow." The Tramontana, or north wind, owing to the northern mountain boundary which protects the Riviera, is less felt than those other winds, except in places, like Ventimiglia, exposed to winds blowing down long valleys penetrating the chain of Alps in a direction due north and south. There are also, of course, the regular daily breeze which blows from the sea on to the land, and the regular evening land breeze blowing seaward. It must not be forgotten either that in the towns along the Riviera the invalid is exceptionally well off in point of hotels, house accommodation, the command of the best medical skill, and in many places the presence of nurses trained in the hospitals of London.

I shall attempt in another chapter to estimate the various claims and to state the different characteristics of the various health resorts along the Western Riviera. Speaking generally, the climate of the Western Riviera is tonic, stimulating, and exciting, especially useful in cases where the vital energy is drooping and wants flogging into renewed activity. It often proves injurious to persons of a nervous and irritable temperament, and to cases which have a tendency to febrile excitement. It is on this account often ill borne by many hysterical persons and hypochondriacs; and this leads me to refer, in conclusion, to another group of health resorts, which, although littoral stations like those on the Riviera, have very different properties and characteristics. I allude to the comparatively sedative climate of the stations on the south-west coast of France—Arcachon, Biarritz, St. Jean de Luz—the adjacent Spanish town, San Sebastian; and with these littoral climates we may associate the neighbouring inland health resorts of Pau and Dax.

As an example of a sedative, yet not a relaxing climate, Arcachon has seemed to me, from personal observation, to possess singular advantages for the treatment of certain maladies. Ten miles from the Atlantic coast, from which it is separated by high

sand dunes covered with pine forest, it is protected to a great extent from the fury of the west and south-west winds by the dense forest, which also offers a protection from the winds coming from the east and south-east. To the north of the town lies the great sea basin, a harbour many miles in extent, inclosed on all sides, only communicating with the Atlantic by a narrow channel running almost due south. The north and north-east winds must pass over this basin, and become thus somewhat warmed in winter and their irritating dryness diminished, while it is maintained that they also bring from the surface of this unusually salt sea water, and from the vast extent of sands exposed by the retreating tides, an appreciable amount of saline and other marine emanations, to give a special efficacy to the air in certain scrofulous conditions. It shares also in the equable temperature which belongs to littoral climates. It must be admitted that the air at Arcachon contains much moisture, owing to the west and south-west winds which blow in from the Atlantic and bring much rain and mist; but, owing to the extreme porosity of the soil, which for miles and miles is wholly sand ("there is not a stone within twenty miles," was the testimony of a resident Englishman who knew the district well), the water is drained off from the surface as soon as it falls, so that there can never be any stagnant water on the ground. The air of the forest is also impregnated with the balsamic resinous emanations from the pine-trees, peculiarly grateful to some forms of chest affections; and, moreover, it is found to be very remarkably rich in ozone. I have heard it somewhat carelessly remarked that the pine-trees have been ruthlessly cut down at Arcachon, and this is a fair example of the kind of superficial criticism that often passes current with respect to health resorts. It is not, of course, possible at Arcachon or elsewhere to build houses on the tops of trees, and so long as this is the case, if houses have to be built, trees to a certain extent must be cut down to make room for

them. But Arcachon contains two quite distinct parts: there is the Plage, a level tract on the south shore of the Bassin, which is occupied by somewhat closely packed streets and houses, and which in summer-time becomes a sort of Margate for the population of Bordeaux; there is also the Ville d'Hiver, separated from the former by a high sand-hill, and which consists of numerous villa residences actually built in the forest; each house being surrounded on all sides by pine-trees. The prevailing winds, north-west, west, and south-west, being sea winds, are not cold, like continental winds; but they often blow with great violence, and were it not for the protection of the lofty pine-trees, *over* the tops of which they blow, they would form a serious drawback to the climate. They are most frequent from December to February, and they usually blow continuously, day and night, for several days in succession; it follows that there is less sudden transition from day to night temperature here than in the Riviera. The climate of Arcachon is, in short, mild and soothing, and it is especially suitable to cases of irritative bronchial or laryngeal catarrh, to cases of phthisis with tendency to congestion or inflammatory complications, and to persons of nervous temperament. It is not suited to persons of a lymphatic and torpid habit, who do better in the tonic and stimulating air of the Western Riviera. Cases of consumption and of other chronic lung diseases have certainly been arrested at Arcachon, and dyspeptic persons, in whom the dyspepsia has been complicated with hysteria, hypochondriasis, and nervous irritability, have derived great benefit from its climate. Biarritz, with its excellent hotels and cheerful town, has, in some respects, the same qualities as Arcachon; but as it lies exposed to all the fury of the Atlantic winds, and has no protection like the pine forest of Arcachon, it is more bracing and less mild than it, and by no means so suitable to cases of chest disease. It is, however, well suited to some forms of nervous

exhaustion and irritability. St. Jean de Luz, being a little to the north of the last westward spurs of the Pyrenees, is beautifully situated in a fine bay a few miles south of Biarritz, with the climate of which it has much in common. It is, however, more protected from winds, and better suited therefore to pulmonary invalids. But it would be found dull and deficient in accommodation compared with other winter stations. We have little precise information about the climate of San Sebastian. It certainly shares the mild sedative character of the adjacent health resorts on the south-west coast of France, while it would in all probability be found warmer and more sheltered, and therefore better suited to pulmonary visitors; while for historical interest and beauty of situation it certainly carries off the palm. The climate of Pau, its advantages and disadvantages, have been so vigorously and hotly contested, that in order to avoid entering on controversial ground, I shall content myself with stating that all are agreed in the fact that it is greatly protected from winds, and that the air there through a considerable part of the year is exceedingly still and motionless. Everyone also knows that it enjoys an admirably picturesque situation, and that the winter visitors find a great deal more sunshine there than they would in England, combined with every distraction and amusement they can desire. Moreover some forms of asthma and chronic phthisis undoubtedly do remarkably well there. It is a sedative, not a tonic climate. Dax resembles in climate its neighbour Pau. It has, however, thermal springs and a hydrotherapeutic establishment, which may commend it to many invalids who desire to combine hydrotherapeutic treatment with a residence in a mild but salubrious and sedative climate.

I have only one other winter health resort to mention, and that is Amélie les Bains, in the Eastern Pyrenees. It is little thought of as a winter station for English people suffering from chest complaints, yet it has very considerable recommendations. Its

climate is intermediate in character between the exciting south-east and the sedative south-west coasts of France. It has been found of great value in cases of consumption and catarrhal asthma, in persons who found the climate of the Riviera too irritating and exciting, and that of Arcachon too mild and relaxing.

A very few general observations must conclude this brief survey of winter quarters. In searching for a winter health resort, what do we desire to avoid and what do we desire to find? There are three things which we desire to avoid, especially when they are found combined together, as in our own winter climate, and these three things are damp, cold, and variability. It is the combination of these three conditions which makes the climate of England so unsuitable and even dangerous to many persons. It gives rise to the distressing catarrhal conditions which are so common, and which often lead to graver disturbances of health. It is the cause of attacks of acute and chronic rheumatism, of many forms of neuralgia, and not infrequently it is responsible for serious inflammation of internal organs. This combination of climatic conditions, necessarily associated with a clouded and sunless sky, produces a further depressing effect on the mind and spirits. It need scarcely be said that the more sensitive the organisation, the more acutely will these unfavourable conditions be felt. What we seek, then, in a winter climate is the opposite of these conditions, viz. dryness, warmth, and equability. But it is always difficult to get all we want; besides, as a matter of fact, while some invalids require a combination of warmth and moisture, others need warmth and dryness, while others do better in a combination of cold and dry air; but no one wants a combination of cold and damp, and all desire sun-heat, a clear sky and as much of it as possible; and we shall find, as a rule, the value of a winter climate depends on the number of clear and sunny days, or the number of days and hours during which an invalid can take

exercise or be in the open air. ★The mere absolute amount of rainfall seems of small importance, provided the nature and inclination of the soil is such that the water drains off rapidly from the ground, and that there are long or frequent intervals of clear, sunny skies. Indeed, as I have already pointed out, heavy rains often have a salubrious effect in cooling and cleansing the atmosphere. It seems quite clear, too, that diurnal variability of temperature, even within wide limits, does not render a climate unhealthy even to invalids, if it is also a dry climate and the invalid learns to protect himself from the possibility of sudden chill. Nor does humidity, when accompanied with moderate warmth, seem to be necessarily unwholesome, especially in oceanic climates. There are obviously many other details demanding consideration, some of which are dwelt on in other chapters. One word, however, with regard to the expense attending a change of winter quarters, which proves such an obstacle to many an invalid. Let me say to him in the words of Dr. Johnson, "Sir, your health is worth more than it can cost;" or let me remind him, in the words of another author, whose name I cannot at this moment recall, that "if life without money is not much, money without life is nothing at all."

CHAPTER VIII.

THE WESTERN RIVIERA.

A STUDY OF ITS CLIMATE AND A SURVEY OF ITS PRINCIPAL RESORTS (HYÈRES, CANNES, NICE, MONACO, MENTONE, BORDIGHERA, SAN REMO, ALASSIO, PEGLI, ETC.).

Comment se peut-il, que . . . vous ne passiez pas vos hivers . . . dans un endroit quelconque où se voit le grand arbitre des santés humaines, Monseigneur le Soleil ? Je crois que sans lui je serais depuis bien longtemps à quelques pieds sous terre.
—*Lettres de Prosper Mérimée.*

THE many picturesque towns that lie scattered along the beautiful Mediterranean coast of France and Italy have long been the favourite winter resorts of the inhabitants of Northern Europe. Some of these have enjoyed a reputation as winter health resorts for a very long period, while others have quite recently grown into popularity and renown. And there can be little doubt that if the stream of winter visitors continues to pour into the Riviera in the same increasing proportions that the past few years have witnessed, many of the smaller villages along this highly favoured coast, whose names are at present scarcely known beyond their immediate neighbourhood, are destined to become as renowned, and justly so, as some of their most popular neighbours.

Passing from west to east, the health resorts of the Western Riviera may be said to begin at Hyères,

a few miles from the important arsenal of Toulon, and to end at Pegli, a few miles west of Genoa. Between these, its western and eastern limits, we have the well-known French stations, Cannes, Nice, and Mentone, the principality of Monaco, with Monte Carlo ; and the Italian towns of Bordighera, San Remo, and Alassio, besides many smaller and less known places on the coast between these.

In geographical strictness, Hyères is not included in the Western Riviera, the *Riviera di Ponente*, since the mountains of the Esterels, to the west of Cannes and many miles east of Hyères, form its western boundary ; but as a health resort this town naturally falls into the group which I have just indicated, and with the other members of which it has much in common.

Before considering the distinguishing characteristics of each of the principal health resorts of this region, it will be convenient to consider briefly the general characters of the climate of the whole district of the Western Riviera. The Riviera is a land of sunshine and a land of winds. It is a land of intense brilliant sunshine, and of cold chilling shade. The very intensity of its sun-heat is to some extent the cause of its manifold local currents of air. The air is scarcely ever still, although, of course, some localities are much more protected from the prevailing winds than others. The climate of the Riviera, then, has conspicuous merits and conspicuous defects. But we may rest assured that a perfect climate in winter is to be found nowhere, neither on the Riviera nor elsewhere. The great thing is to know thoroughly the nature of a climate before you resort to it, so that you may obtain the full advantage of all its good qualities and guard yourself against suffering from any of its bad ones.

In examining the climate of any district the chief points to be considered are—1. Its temperature, with its variations. 2. The relative proportion of sunshine and cloud ; of clear skies and of skies that are overcast. 3. The amount of rainfall and the number of

rainy days. 4. The average humidity of the air, i.e. the amount of insensible aqueous vapour in the atmosphere. 5. The prevailing winds, and the amount of exposure to or protection from them afforded by local conditions.

Let us, then, in the first place consider the temperature of the Riviera.

The several health resorts of the Western Riviera lie between 43 and 45 degrees N. latitude, while London lies at 51°30 degrees; and for this reason alone the sun has naturally more power there than with us. And since the higher temperature of the Riviera is chiefly due to the greater power of the sun, to the intensity of the sun's rays, it follows that the difference between sun and shade temperatures is very considerable, and that while in a room looking south you may find brilliant sunshine and summer heat, in a room in the same house, facing north, you will encounter chill shade and winter cold. And similarly, out of doors, there is great risk of chill in passing from sun to shade. It has been found that the mean temperature given by a thermometer, exposed to full sunshine in the winter, will reach 129·9 degrees Fahrenheit, while in the shade of a northern wall it will not reach more than 55·9 degrees, giving a difference of 74 degrees between sun and shade temperatures.* And this is a fact which it behoves delicate visitors, and indeed all visitors, to the Riviera constantly to bear in mind. If they would benefit by the great heat of the sun, they must

* Dr. Hassall has contested the truth of this statement, which rests on the authority of an excellent meteorologist, M. Teyssie of Nice; Dr. Hassall's observations were made at San Remo, and it is obvious that what may be true at Nice may not be true at San Remo. But the real explanation of this difference of opinion probably depends on the signification given to the word "mean." M. Teyssie evidently intends the mean of a certain limited number of observations made at a particular period of the day; while Dr. Hassall refers to a more strictly scientific mean, or average of the whole of a season. For the object in view M. Teyssie's method is sufficiently exact.

take care to protect themselves against the corresponding chill of the shade.

It would be a mistake to regard the Riviera in the winter as a hot climate, as some persons seem to expect it should be ; and, indeed, if it were altogether a hot climate it would be a far less generally useful and valuable climate than it is. Still it is a climate in which the inhabitants of Northern Europe may in the winter find, on an average, much more warmth than at home. It is found that the mean winter and spring temperature of the Riviera (and it must be borne in mind that our remarks apply principally to these parts of the year, viz. between October and May) is from 8 to 10 degrees Fahrenheit higher than that of England. I am, of course, speaking of averages, and not of coincident periods of time, for in some months of some seasons the mean temperature of parts of the Riviera will be found nearly as low as at home. For instance, at Cannes, in December, 1874, the mean excess of temperature over that of London was only 4·3 degrees Fahrenheit, and in February, 1875, still less, viz. only 3·6 degrees.

It is by no means to its southern latitude alone that the Western Riviera owes the relative mildness of its winters; for both Genoa and Florence are within the same latitude, and it is well known that they do not possess by any means the same mild winter climate. It is rather to the protection from northerly winds which is afforded it by the great mountain barrier of the Maritime Alps, which extends nearly along the whole of this coast, and at a sufficient elevation to prevent the cold winds which blow from Northern Europe, and over the snowy Alps of Switzerland and Savoy, from reaching the towns built along this part of the northern coast of the Mediterranean. Some of these towns are better and more completely protected than others from northerly blasts by reason of the relative nearness to them of this mountain wall, and by the unbroken nature in parts of the barrier it forms; while at other parts the

existence of gaps in the chain diminishes the protection it affords, and renders some of these localities quite unsuited for winter health resorts. Thus many of the towns along that part of the coast which extends from San Remo to Genoa, owing to the greater remoteness from them of the higher chain of Maritime Alps, and the comparatively low elevation of the mountains near them, are rendered much more accessible to northerly winds, and much less suited than the more western towns for the reception of invalid winter visitors.

Another cause of the mild winter temperature of the Riviera is its southern exposure along the shore of a sea the water of which is unusually warm. It has been calculated that the temperature of the Mediterranean off this coast is 20 degrees higher than that of the Atlantic at the same depth and in the same latitude ; and that the temperature of the surface of the sea (off the coast of Cannes) has a mean excess of about 12 degrees Fahrenheit over the minimum temperature of the air, and a mean excess of 9 degrees over that of the sea on our own southern coast (Falmouth). Hence it follows that the atmosphere on this coast of the Mediterranean must obtain a considerable addition of heat during winter from that which has been stored up in the sea during summer, and which is slowly diffused through the air during the colder season.

It is pretty generally known that there is a great fall of temperature on the Riviera at sunset, and that owing to this fact the time of sunset and the hour or two which follow it is a particularly dangerous part of the day to invalids and other persons, and one during which careful precautions should be observed. This fall of temperature at sunset is easily accounted for, and is always encountered whenever, owing to the absence of aqueous vapour in the air and the presence of clear cloudless skies, solar radiation is very powerful ; for then when the sun is withdrawn the whole surface of the country is plunged in shade, the air no longer derives any heat from the direct solar rays, and the

temperature of the whole air is a shade temperature. But this is by no means the only cooling agency that comes into operation at sunset. When the sky is free from cloud and the atmosphere clear, as soon as the sun sets the heat which has been absorbed by the surface of the earth during sunshine is rapidly lost by radiation into space, and the air in contact with or near the ground is rapidly cooled, and the moisture it contains becomes precipitated in the form of dew, and thus the lower strata of the air become damp as well as cold at and after sunset. When the sky is overspread with clouds, these prevent the radiation of heat from the earth's surface into space and reflect it back to the earth, so that the chilling of the surface at sunset is not nearly so great when the sky is cloudy as when it is clear. Hence it follows that it is especially during clear cloudless weather that invalids must be cautious of exposing themselves to the fall of temperature and deposit of dew which occur at sunset.

The temperature rises again two or three hours after sunset, and again falls to the minimum of the twenty-four hours towards sunrise, so that it is less dangerous to be out of doors three or four hours after sunset than at the time of sunset itself.

In the second place, as to the relative proportion of sunshine and cloud; the excess of sunshiny days during the winter in the Riviera over that of our winter is remarkable. If we compare Nice with London, we find that during the six winter and spring months, i.e. between October and May, there are on the average ninety-seven clear cloudless days at Nice, and only twelve in London! We are justified then in saying that the Riviera is a land of sunshine.

Next with regard to rain. It may be said, speaking generally, that it is a land of heavy rainfalls and few rainy days. But much more rain falls at the eastern end of the Riviera di Ponente, i.e. about Genoa, than at the western end, i.e. around Nice; e.g. the mean annual rainfall of Genoa being 1317

millimètres, that at Nice is 811, and that at Hyères only 746; while the rainy days from November to April, both months inclusive, number 67 at Genoa, 43·5 at Mentone, 36·2 at Nice, 45·8 at Cannes, and 37·5 at Hyères.

Compared with England, the climate of the Riviera is undoubtedly a very dry one. It is quite true that for a few days in autumn and spring there are torrents of rain, so that the total average rainfall may nearly equal that of the west coast of England; but the number of fine days "is immensely greater, both in summer and winter, than in almost any other part of Europe."

If we compare the rainfall at Nice during the five winter months, between October and April, with that of London and that of Torquay during the same months, we find that

Nice	has	16·92	inches,
London		9·51	"
Torquay		18·28	"

so that nearly twice as much rain falls at Nice during the winter as in London. But now let us compare the number of rainy days during the same period, and then we have at Nice only 30·5 rainy days, while in London there are 76·5, and at Torquay 98!

On the Riviera large quantities of water fall within a few hours or days; "there are three or four successive thoroughly wet days, and perhaps nights, and then the weather clears up for some time, and the sky becomes bright and cloudless." It is very rare to encounter continuous broken weather on the Riviera, still it does occur occasionally, and the winter 1878-79 was a notable case in point. The following figures indicate the rainfall at Cannes and Mentone, and the number of rainy days during this exceptional season:

CANNES.							
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.
Rainfall in } inches	4·34	8·35	3·79	4·46	3·94	7·73	7·50
Rainy days	10	13	12	10	15	8	16

MENTONE.

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.
Rainfall in inches	10'43	6'95	2'84	2'17	3'92	4'57	8'10
Rainy days	14	14	16	9	10	9	17

As a rule the winter rainfall is distributed in the following manner: it is common to have a heavy fall of rain in October, as many as thirteen inches will often fall in that month; the next greatest rainfall is in November, then December. Next comes March; and January and February have the lowest rainfall. In April there are heavy falls of rain again as in October.

But the Riviera, like every other locality, is subject to great variations in different seasons, and in the same months in different seasons: e.g. the rainfall in Mentone,

In November, 1866, was	27 inches,
" " 1877, "	10'12 "
" December, 1866, "	2' 0 "
" " 1872, "	12'94 "

The year 1877 was a very dry one on the Riviera, and if we compare the total rainfall and the number of rainy days for the whole of that year at Toulon with that of London and Torquay we get the following figures:

	Toulon.	London.	Torquay.
Rainfall in inches	12'82	26'46	42'25
Rainy days	50	172	224

Taking the average of a succession of winters, the Riviera is a very dry climate, the number of rainy and cloudy days being very few compared with the number of dry and clear days; but it has exceptional seasons, as that of 1878-79 was, and those who were unfortunate enough to pass that winter, and that winter *only*, there, may possibly have carried away with them the conviction that the climate of the Riviera is a very wet and disagreeable one.

In the next place, if we compare the records of the humidity of the air during winter, as observed

in certain stations on the Riviera, with those obtained from similar observations at certain stations at home, we get decided evidence of the superior dryness of the atmosphere of the former. Saturation being represented by 100, we get the relative humidity of the Riviera (Cannes and Mentone), as compared with London and Falmouth, represented by the following figures :

Cannes and Mentone.	London.	Falmouth.
72'4	88	84'4

and Dr. Hassall's observations for last winter at San Remo give 72'6 as the mean relative humidity at that station.

It is not an easy task to write a description of the winds of the Riviera. They are legion. The Mistral, the Sirocco, the Greco, the Tramontana, the Sea wind, the Land wind, etc. Indeed, certain exposed localities on the Riviera are rendered wholly uninhabitable on account of the number and fury of these tormenting winds ; and the relative merits of its various health resorts chiefly depend on the greater or less protection afforded them against the prevailing winds by the surrounding mountains. Moreover, some difference of opinion seems to prevail amongst observers resident at different stations as to the prevalence or non-prevalence of particular winds at these stations. This is especially the case with regard to the Mistral, and the local advocates of each station rival one another in claiming a relative immunity from its visitations.

The Mistral is a wind which blows from the west and north-west. It is a very dry wind, and a wind which generally brings fine clear weather, although it is always attended with a falling barometer.* It is

* Dr. Sparks remarks that the barometer is comparatively useless in predicting weather in the Riviera. It falls with the north-west wind, which is a dry one, and it does not fall with a south-east wind, which actually brings torrents of rain.

a wind which blows with great fury, and owing to its dryness raises clouds of dust. The air loses its humidity and becomes dry, cold, penetrating, and irritating. The dryness of this wind is accounted for by its losing all its moisture as it sweeps over Central France. It appears to be a northerly wind originally, which reaches the Western Riviera by turning the western flank of the Maritime Alps, and so gets a westerly direction given to it. It is especially the torment of the more westerly stations, such as Hyères and Nice, but it is also felt at times, usually with diminished violence, as far east as San Remo.

March is its favourite month, it then blows its fiercest, and more frequently than in any other of the winter and spring months, but it blows occasionally all through the winter.

The Sirocco is a south-east wind, it is a hot African wind, and only reaches the northern shores of the Mediterranean after having crossed this sea and so become laden with moisture; hence it is a wet wind—warm, wet, and enervating. It brings to this coast the heaviest and most prolonged rains. But these rains do not usually appear until after it has blown violently for a day or two. The spring and summer are its favourite seasons, but it may occur for two or three days in any of the winter months.

The east wind, which frequently blows in spring and summer, is not very often encountered in winter, and in this region it is not the formidable and dreaded wind it is with us. It is frequently followed by rain, and is most common from March to May, when it occasionally blows with great force.

A very disagreeable wind is the north-east wind, or Greco. It is biting cold, and not unfrequently brings with it sleet, hail, and even snow. It fortunately does not blow often. It is more felt and is more frequent and severe along the eastern portions of the Riviera di Ponente than along its western parts, and Genoa owes much of the bitterness of its climate to its exposure to this wind.

The Tramontana is the name given to the north wind. Most of the health resorts along this coast are protected from it by the chain of mountains which rises behind them, and forms a more or less complete protection from winds coming from this quarter. These northerly winds are either completely arrested by this mountain barrier, or they blow over the tops of the mountains, and are only felt at some distance from the coast. But this barrier is in some localities not so perfect and effective against these winds as at others. "Where long valleys run down in a direction due north and south, as at Ventimiglia, the north wind may have free access," and so, owing to the lower elevation of the near hills, the district east of San Remo is less protected from northerly winds than the western portion of the same coast. Nice, also, as we shall see, is but imperfectly protected from these northerly winds.

Occasionally a strong wind is felt from the south-west,* it is a dry wind, having parted with its moisture in its course over the Spanish Sierra and the Pyrenees. A wind also often blows with considerable violence from the west; this and the south-west wind are regarded by some as really "deflected Mistral." It is very well known that on sea-coasts generally, in fine sunny weather, there is a breeze which blows from the sea on to the land during the day, while at night the reverse takes place, and a breeze is found blowing off the land on to the sea. I have explained this fully in a former chapter.† This wind from the sea is very much felt all along the Riviera, even as far as a mile from the sea, especially on sunny days. It begins to blow about 11 a.m., and continues till 3 or 3.30 p.m. It occurs then, because it is then that the surface of the land becomes heated by the sun, the air in contact with this surface becoming warm and rarefied ascends

* Some observers state that the south-west wind is a wet wind, and it would seem that it really does bring rain to some parts of the Riviera.

† Chapter I., "Sea or Mountain."

towards the mountain-tops, and the colder and denser sea air rushes in to take its place, and this goes on as long as the heating action of the sun continues. When the sun goes down, the air on the surface of the land becomes rapidly cooled by radiation into space, and therefore denser, while that in contact with the sea remains warm, and then it is that a land breeze springs up blowing on to the sea.

This, then, is a brief account of the principal winds which the visitor to the Riviera must expect to encounter from time to time. The greatest number of calm days occur in January and December, and the windiest months are March, April, May, and October. The strongest, as well as most frequent, winds are from the east and the south-west. The Mistral, as I have already said, is most common in March.

Having thus briefly considered, from a general point of view, some of the chief characters of the climate of the Western Riviera, I now propose to pass in review the principal resorts on this coast.

Hyères is one of the oldest health resorts on the French Riviera. It is not actually on the coast as are the other health resorts of this region, but it is about three miles distant from the sea, a plain of this extent stretching between the town and the coast. So that the exciting influence of the sea is not experienced at Hyères, and this is considered to be one of its advantages. It suffers, of course, much less from the sea breeze than other resorts on the coast, not only because of its distance from the sea, but also because of the protection from the sea winds afforded by the islands off the coast—the Isles d'Hyères. These “consist of three principal islands and several islets, forming a chain nearly parallel to the shore, and from two to three miles distant from it.” Thus they “form a kind of wall to the south of the town.”

The town itself is built along the base of a steep rocky hill, having a southern or south-eastern aspect. This hill forms part of a small and picturesque

chain of mountains which bounds the valley of Hyères to the north; mountains, to the east and north-east, close in the plain of Hyères in that direction and project as a promontory into the sea, protecting it quite sufficiently from the north-east, but less completely from the east winds. On the opposite side of the valley, that is to the west and south-west, a series of hills rise and form a kind of screen between it and the roadstead of Toulon. The valley near the sea is swampy, but in the neighbourhood of the town it is exceedingly well cultivated, moreover it gradually rises towards the town, which is built at an elevation of sixty or seventy feet above the level of the valley, and in a situation admirably chosen for gaining all the advantages possible from the heat of the sun. The town is, therefore, much warmer and drier than the valley, which is, in parts, occasionally cold and damp.

We see, then, that the valley of Hyères is protected to the south by the Isles d'Hyères, to the north as completely by ranges of high hills, to the north-east also it is fairly well protected, but it is exposed to the north-west and west and to the south-east and east. Owing especially to its protection from sea breezes, and also from the north and north-east winds, and to the rarity or mildness of the east wind, at this distance from the coast, the atmosphere at Hyères is sometimes exceedingly still and calm, unlike the other health resorts on this coast, where perfect stillness of atmosphere is most rare. And the air here is neither so dry nor so sharp as at Cannes, Nice, or Mentone, and its climate is, therefore, less exciting and more soothing. But these advantages are mitigated by the existence of one very serious drawback. The valley is completely exposed, in its whole length, to the Mistral, which from February onwards blows with great force and great frequency. A French physician, who had passed a winter there, says of this wind: "It rakes the valley from end to end, with no obstacle to stop it or turn it, it blows sometimes for six

or seven days together and nights too! In February and March this fearful wind prevails at least one day in three, bringing with it much dryness and dust. I confess I cannot understand how an invalid can remain in such a climate without taking harm. Favourable as I believe this station to be up to the time that the Mistral begins to blow, equally dangerous do I believe it to be from that moment.*

The temperature records available with respect to Hyères are not very satisfactory, but it seems to be agreed that the climate, apart from the winds, is a very mild one. The temperature is about ten degrees warmer than in England. It seems also to be more equable than at some of the other stations—not so hot in summer and not so cold in winter—and the daily range also appears to be less extreme. In the depth of winter the thermometer rarely falls below 44 or 45 degrees Fahrenheit. Dr. Cazalis, however, states that he saw snow fall three times in the same winter, but it only rested on the ground a few hours; and that frost is very frequent in the valley, but very rare in the town. There would seem to be a great difference between the valley and the town. "The town is warm, but the valley, at four hundred yards from the town, is cold." Owing to the coldness and dampness of the valley heavy dews fall at sunset, and extra precautions are required to protect oneself against the consequent chilling of the atmosphere; and fogs are not very uncommon over the islands and the plain in spring and autumn.

There are no good and recent statistics available as to the rainfall at Hyères. It would seem, however, to be from twenty-eight to thirty inches in the year, with an average of about sixty rainy days. The winter and spring months are probably somewhat drier than at other health resorts on the Riviera. The water supply is good, and the sanitary condition of the town satisfactory, except in the old parts,

* Dr. Cazalis, "*Étude sur le Climat de Cannes.*"

which remain dirty and ill-drained. There are but few villas, invalids and visitors living for the most part in hotels, of which there are several fairly good ones, the cost of living at them being somewhat less than at the best hotels at Cannes or Nice. There are many charming and picturesque promenades, and in this respect Hyères is much better off than most other resorts on the Riviera. But life is somewhat monotonous and dull there, and the French complain bitterly of its *ennui*. As to the cases of illness to which its climate is best suited, there seems an extraordinary divergence of opinion amongst different authorities. But I think it may be safely said that it is suited to persons of nervous temperaments who dislike the sea, and who find Mentone and Cannes too exciting, and that they cannot sleep at these places. Some denounce it altogether for chest cases, on account of the prevalence of the Mistral during the spring months; others think it well suited to cases with a tendency to hæmoptysis, on account of its more soothing character. It is good for nervous feeble children, and for some forms of gout and rheumatism. It is not bracing and stimulating enough for scrofulous cases, nor is it suitable to asthmatics. The natives of Hyères are said to be exceedingly healthy and long-lived. "There is no scrofula among the children, and phthisis is scarce. At the cemetery the large number of old people buried there attracted my attention." (Sparks.)

But the objections which have been urged against the climate of Hyères do not apply to a resort situated on the southern slopes of the hills opposite Hyères. Here there are valleys admirably situated, sheltered from the Mistral and from all but southern winds, warmed all day by the sun, and provided with many most charming and picturesque walks. "Ces situations," says Dr. Cazalis, "sont des plus belles et des plus chaudes qu'on puisse rencontrer sur nos côtes; il n'y manquent qu'une chose: ce sont des habitations: à part trois ou quatre villas, il n'y a sur cette

côte aucune maison." This refers to the valley of *Costabelle*, about two miles south-west of Hyères, and destined probably to become equally famous. The principal residence there is a villa which has been built by the Duke of Grafton. The only hotel there is the small Pension Anglaise, which can only accommodate about twenty-two persons. "The valley is embosomed in pine woods, broken here and there by vineyards and olive orchards, and by the gardens of the few villas which have sprung up as yet. Near the shore there are large groves of olive-trees, which are finer than at Hyères itself, and indicate a warmer climate."*

The next of the health resorts on the Western Riviera which we arrive at in journeying eastward is *Cannes*. It is about three hours from Toulon by rail, and about five hours from Marseilles. The railway on leaving Toulon enters a depression, which runs at some distance from the sea, and separates the southernmost spurs of the Maritime Alps from a mass of mountains—the Montagnes des Maures, which occupies the space between this valley and the Mediterranean coast. These mountains are quite distinct from the Alps, and appear to belong to the same system of mountains as those of Corsica, of which they may be regarded as the termination, jutting up, as it were, from the floor of the Mediterranean, and joining themselves on to the coast of Provence. These mountains occupy the coast-line from Hyères nearly to Fréjus. Owing to the absence of roads (there is no road even along the coast), their wild and picturesque recesses are almost inaccessible, and the beauty and grandeur of this coast-line are little known or even thought of by the hundreds of strangers who annually visit the Riviera. It is on the part of the coast formed by these mountains that the beautiful but little-known Gulf of St. Tropez is situated.

The railway again reaches the sea at Fréjus, and between Fréjus and Cannes it skirts along its shore

* Sparks, "The Riviera."

the whole way. Most magnificent are the views of sea and mountain and coast-line which one gets, from time to time, as the train turns round the grand promontory (Cap Roux) formed by the Esterel mountains, which separate the Bay of Fréjus from the Bay of Napoule, and as it runs from tunnel to tunnel and from cutting to cutting along the eastern side of these beautiful mountains. It is impossible to be too enthusiastic about the beauty of the Esterel range, the great feature in the landscape at Cannes. "Ce qui fait," says a French writer, "son incomparable beauté, ce sont les superbes promontoires de porphyre et de grès rouge d'où l'on domine, à la fois, les deux golfes de Fréjus et de la Napoule. La contraste des eaux bleues et de la roche qui semble flamboyer au soleil à travers la verdure est d'un prodigieux effet. Le Cap Roux, dont les escarpements couleur de braise se profilent à l'angle de la montagne, est un des spectacles les plus grandioses de la Méditerranée."*

From Napoule, which is situated at the eastern base of the Esterels, and gives its name to the bay, we get a magnificent view of Cannes as it lies facing south, bathed in sunshine, stretching along the eastern end of the bay, its countless villas spreading far and wide on the undulating rising ground which lies between the sea and the lower hills, with the range of snowy Alps for the distant background. For the foreign visitor, Cannes is rather the name of an extensive district than of a small coast town. Unlike any of the other health resorts on the Riviera, it is scattered over a wide tract of land, so that its eastern and western limits are some miles apart; and its attractions and beauties are not limited and concentrated in one particular spot, but are varied and widespread. There is no sense of restraint and imprisonment in a place like Cannes, where the landscape is wide, open, and free. Corresponding with this great range and

* Elisée Reclus.

variety of territory there is a corresponding range of climate. "Grâce à la configuration de notre station," says Dr. Cazalis, "nous jouissons d'une gamme de climats différents, plutôt que d'un seul ; près du Cannel se trouvent des situations abritées des vents, et des effluves salines ; près de la mer l'atmosphère est agitée, saturé de sel, excitante. Entre ces deux extrémités se trouve une série de positions mixte qui conviennent à bien des genres divers de malades."

It is customary to say that Cannes occupies two bays, an eastern and a western ; but this seems to me to be scarcely correct. There is one large bay, the Golfe de la Napoule, having the Esterel mountains for its western boundary, and the low-lying narrow point, the Cap de la Croisette, for its eastern limit. A relatively small portion of this bay, at its eastern end, is separated from the western part by a hill of no great elevation, which stretches out from one of the ranges to the north of the town and projects into the sea. This hill, the Mont Chevalier, is surmounted by the ruins of an old tower and the old Cathedral of Cannes ; and along its eastern aspect the chief part of the old town is built. This projecting rock, prolonged by a pier, incloses a small harbour ; and this, with that part of the shore between it and the Cap de la Croisette, is termed the eastern bay. A fine carriage road runs along the whole length of this bay, with villas and houses on one side of it, the beach and the sea on the other. The adjacent part of the shore of the western bay is also covered, for a mile or two, with streets, and villas, and hotels, and their gardens extend in all directions for a considerable distance inland.

With regard to the climate of Cannes, in the first place, if we consider the whole district, there can be no doubt that it is less protected from winds than some of the other resorts on the Western Riviera, and that Cannes, on the whole, must be considered a rather windy place. "À Cannes, l'air est toujours en mouve-

ment, mais ce mouvement aérien est très souvent fort minime et ne règne pas dans tous les points du territoire.”*

The protecting chains of high mountains to the north are removed to some considerable distance from the coast, and scarcely offer so complete a screen from northerly currents as they do when close to the town, as at Mentone. The Esterels present a considerable barrier to the approach of the Mistral; but the protection from this wind is not complete; there is more or less of a gap between the hills to the west and those to the north-west, through which this wind is able at times to reach Cannes. The mountains to the east and to the north-east are not sufficiently high to afford a complete protection from winds coming from those quarters. The prevailing winds at Cannes come from the east, varying from north-east to south-east. A wind from the north is rare, and always feeble. Still more rare in winter is a wind blowing directly from the south. Dr. Cazalis gives the following as the result of several years' personal experience. Towards the last week in October the wind, sometimes from the east, sometimes from the west, becomes high. In November there is always a windy and rainy period, lasting from eight days to three weeks. The wind is rarely violent, and never cold. During or after this there may be a few days of Mistral; then commences the reign of the east wind, a mild wind which lasts till February. December and January are the least windy months. West winds begin again in February, and the north-west (Mistral) may blow for two or three days. In March the winds are often violent, and bring not infrequently torrents of rain, as in November. In April the winds are very variable; but it is almost always easy at Cannes, owing to the extent and varying inclination and aspect of the ground, to find sheltered situations for exercise during the prevalence of even the strongest winds. The

* Cazalis, “Climat de Cannes.”

neighbourhood of Cannet, a village about two miles to the north of Cannes, presents many most favourable and protected sites for dwellings and for promenades; and delicate persons, especially those who suffer from chest affections, or those of sensitive nervous temperament, who find the neighbourhood of the sea too exciting, are strongly recommended to settle in the valley of Cannet.

The temperature observations taken by different persons at Cannes vary considerably, and this variation no doubt depends on the different methods followed by different observers, and the different localities in which their instruments have been placed. It may, however, be stated as an average that the mean winter temperature at Cannes is about 8 degrees Fahrenheit higher than in London; that, compared with other stations on this coast, Cannes is not so warm as Mentone or San Remo, while it is somewhat warmer than Nice. Dr. Cazalis thinks his own personal feelings may be more instructive than the varying and somewhat irreconcilable evidence of different thermometers. "When I come to Cannes," he says, "on the 15th of October, I find a temperature which reminds me of the heat of the suburbs of Paris in August; about the 25th October the temperature falls somewhat suddenly, and a light cloak is needed in the morning and evening. In November come the rains, and after that the temperature gets lower and lower till about the 15th December. Towards the end of January occasional frosts at night in cold spots may be expected, but during the daytime, in clear weather, it is warm enough for invalids to take out-of-door exercise. The temperature rises rapidly in February, but less in March, which is the worst month in the year. At the beginning of April it is often necessary to close the shutters to prevent one's apartments being overheated by the sun, and the heat in the daytime reminds one of a July temperature near Paris." There is a considerable rainfall at Cannes, about thirty-two inches during the winter-time (November to April),

and about fifty-eight* rainy days. As elsewhere on the Riviera, there are heavy falls of rain, lasting often several days, in November and March ; in the former month the rains have been known to last for three weeks ! The winds which bring these rains are usually warm winds, coming from the south-east and the south-west. Between these periods rain is rare, and lasts but a few hours. Snow appears about once every two or three years, and never lies on the ground more than a few hours. A fog is a still greater rarity.

Occasionally a very wet or a very cold season is encountered, and then the sufferings of the visitors are very acute, much more so than at home.

The winter of 1878-79 was a most trying one on account of the prevalence of rains ; that of 1869-70 on account of the cold. Mérimée, who was devoted to Cannes, thus writes of the latter season : “ L’hiver a été affreux. Il a gélé ici à six degrés, phénomène qui ne s’était produit depuis 1821. Toutes les belles fleurs qui faisaient la gloire du pays ont été détruites, beaucoup d’orangers ont gélé. Jugez de l’effet que produit sur une être nerveux comme moi la pluie, le froid, la grêle du ciel ; *on en souffre dix fois plus ici qu’on ne ferait à Paris !* ”

The country around Cannes is exceedingly beautiful, and in the number, variety, and attractiveness of the possible drives and excursions into the surrounding neighbourhood, it possesses advantages over most of the other health resorts on this coast. “ There is very little ploughed or fallow land. Olive-trees alternate with vines. The hills are verdant to the tops with pines and forest trees, and the warm and sheltered nooks are planted with the orange-tree, which is here almost exclusively grown for its blossoms used for making perfumes. Nearly every kind of shrub and flower grows luxuriantly out of doors in the

* It is difficult to come at a constant mean of rainy days from the tables of different observers. Sparks, who is ordinarily very careful, gives 58 in one place, and 45·8 in another.

gardens, and the Cannes gardens are unrivalled in their way."

The eucalyptus tree, with its tall graceful stem and long sickle shape, drooping leaves, now cultivated largely all along the Riviera, is especially noticeable in the gardens at Cannes. Dean Alford writes: "One great advantage of Cannes over other Riviera stations is, that you have actual forest scenery within fifty yards of your hotel. To get such a scene at Nice you have to walk or drive full two miles between high walls; at Mentone, to go quite as far, and to climb till you are worn out with fatigue; at San Remo, to go somewhere else in a carriage." One great drawback, however, to the pedestrian, especially in the central part of Cannes, is the dustiness of the roads, and the absence of cross-roads by which to pass from one district to another. There is also a charming excursion by sea which every visitor to Cannes makes, viz. to the Isles des Lérins, the two islands of St. Marguerite and St. Honorat, which lie about a mile off the coast to the south of Cape Croisette, St. Honorat lying about half-a-mile south-south-west beyond and behind St. Marguerite. They can be visited in a boat from the Croisette, or by a small steamer which goes twice a-day from the harbour. There is an interesting old monastery (des Lérins) on St. Honorat and a fortress on St. Marguerite, celebrated as the prison in which the "man with the iron mask" was confined, and that from which Marshal Bazaine made his escape. There is also a very fine view of Cannes from these islands and its surrounding mountains, extending to the northern boundary of snowy Alps.

Cannes is provided with many excellent but expensive hotels, and numerous elegant villas. There are plenty of good shops where all the necessities and even the luxuries of life may be procured. Of society there is perhaps rather too much, if we consider the interests of the invalid visitors only. Complaints have been made of the drainage of the town,

and bad smells are certainly encountered along the promenades near the shore, where open drains discharge themselves into the sea; but these were to be, and probably by this time are, carried far out from the shore into the sea. In considering what cases are best suited for the climate of Cannes, it must be remembered that Cannes is a bracing place, that its air is tonic and stimulating, and to some nervous and sensitive organisations exciting and irritating. But many who need a calmer and softer climate during the winter months are benefited by a change to the more tonic air of Cannes in the spring—the end of March and the beginning of April. It must be borne in mind also that at Cannes you can avail yourself of two somewhat different climates, according as you choose a residence in the neighbourhood of the sea-shore or inland—in the valley of Cannet for example.

All invalids, except those who suffer from scrofulous or lymphatic conditions, are advised to keep away from the shore. The extreme heat of the Boulevard de la Croisette, the fierce sunshine, the sea air, the wind, excite but do not fortify, induce fever instead of giving strength to a large class of invalids.*

Speaking very generally, it may be said that all scrofulous affections, especially in children, as well as all the milder forms of glandular affections and cases of retarded development, derive very great benefit from the climate of Cannes. These are cases in which the forces of growth, repair, and nutrition require flogging into activity, and the stimulating climate of the seashore—the air, the brilliant sunshine, the restless winds, are all needed to rouse the sluggish temperament into the vigour of health.

Nearly all cases of anæmia improve greatly at Cannes, especially if they lead a prudent and careful life, and take as much out-of-door exercise as possible; even cases of cerebral anæmia in the aged

* Cazalis, "Climat de Cannes."

mend rapidly ; these persons, however, must reside inland, away from the sea, and avoid too much exposure to direct sunshine. The same remark applies to cases of slow convalescence from acute disease. Of cases of chest disease, those of simple chronic bronchial catarrh do well by the seashore. Asthmatics, on the contrary, should avoid the sea, and live as far inland as possible. Cases of emphysema, of chronic pleurisies, and of chronic laryngitis also improve here. Cases of chronic consumption, under certain conditions, do exceedingly well at Cannes ; and even in very advanced stages it will often help to prolong life for many years. But a number of minute details have to be carefully attended to in these cases, which it would be out of place to enumerate here ; it is only necessary to say they must avoid the seashore. Certain forms of chronic gout and rheumatism, and of Bright's disease, are benefited by wintering at Cannes.

Hysterical and nervous maladies, and neuralgias, associated with general nervous irritability, should avoid Cannes, where their sufferings are often aggravated by the too exciting and irritating effect of the climate.

The railway going east from Cannes first skirts the Golfe du Jouan, the fine bay which is bounded on the west by the Cap de la Croisette and the Isles des Lérins, and on the east by the peninsula formed by the Cap d'Antibes, which stretches far out into the sea, and forms the western limit of the wide bay, at the eastern end of which lies the town of Nice. After passing the little military town of Antibes, the line running nearly due north along the western shore of the Bay of Nice, the traveller finds opened out to him a very grand and extensive view of the Mediterranean, and of the Riviera coast as far east as Bordighera, while to the north he obtains a fine view of the Alps behind Nice. After crossing the river Var the train soon reaches Nice, which is twenty miles east of Cannes, the journey between the two towns being accomplished in about fifty minutes.

Nice, it must be honestly admitted, is rather a pleasure resort than a health resort, and whatever differences of opinion may be entertained with respect to the value, in certain cases, of its winter climate, it must also be admitted that whatever defects the climate of the Riviera possesses, these are specially concentrated and aggravated at *Nice*. Of brilliant scorching sunshine there is during most winters an abundance. There are constantly clear blue skies and but little cloud; the air is remarkably dry, bracing, and exciting; there are fewer rainy days perhaps than at some of the other health resorts on the coast. But there are occasionally heavy downpours, which may last for days together in spring and autumn, and in midwinter a continuous bitterly cold drizzle, with a biting north-east wind, as disagreeable and chilling as anything our own climate can afford, is not unknown at *Nice*. The frequency, keenness, and inconstancy of the winds at *Nice* are well known; the wind will shift three or four times a-day, making it impossible to obtain any continuous shelter from it. "The winds," says *Elisée Reclus*, the well-known French geographer, "are extremely inconstant, and sometimes of insupportable violence. At the end of winter and the beginning of spring, when the *Mistral* blows with fury, the blackish dust which it sweeps before it in a whirlwind does not yield in intensity to the rain of cinders showered down by a volcano." Then at *Nice* you are in a large town, not in the country, and you naturally lead a town life rather than a country one. Of course it has the advantages as well as the disadvantages of a town. There is much gaiety and animation, abundance of amusements and pleasures, and a certain amount of social and intellectual activity and interests, so that for a certain class of invalids who dread the *ennui* and quiet of a health resort *pur et simple*, *Nice* has immense attractions. It has also considerable dangers, for the very movement and excitement and gaiety of a place like *Nice* tends to throw the invalid

off his guard, and to lead to some indiscreet exposure or want of precaution which, in such a treacherous climate, may have serious results. But there are persons who must and will have amusement whether they are ill or well, to whom life without constant entertainment is wearisome and fatiguing, who live in constant dread of being *ennuyé*. Let these by all means go to Nice and take their chance there. Then again the social elements at Nice are most heterogeneous, for it is a kind of Paris-sur-Mer, but even more cosmopolitan. The foreign visitors include every nationality in Europe, and many out of Europe, while they are of every class, from princes to pickpockets. When you descend at the railway station, especially if you arrive by one of the evening trains which go on to Monte Carlo, you find yourself surrounded by faces and costumes which irresistibly recall to your mind the Boulevard des Italiens at one o'clock in the morning.

If Nice were the only town on the Riviera where good accommodation and good medical skill could be procured, as no doubt it once was, I could understand the propriety, nay the necessity of sending sick persons there in great numbers, as was once the custom. But to select Nice, when Cannes and Mentone and San Remo and other places are available, for the residence of the generality of invalids, except *for some other reason* than that they are invalids, seems to me difficult to understand. There are, however, a select class of cases for whom the climate and surroundings of Nice seem very suitable. It is said to be remarkably useful to persons who, from overwork or any other cause, have become the victims of atonic dyspepsia, with torpid livers, and a tendency to melancholia. But if such persons suffer from nervous irritability, as they often do, Nice is to be avoided.

It is also beneficial in those diseases of young children and others which depend on the scrofulous and lymphatic constitution. It is a good winter

resort for many aged persons with flagging vitality and with a tendency to catarrhal attacks. Age brings caution, and invalids of this class know how to avoid the bad points and take advantage of the good points of the climate. Nice is also suitable to cases of simple anæmia uncomplicated by any nervous affection. It is also very attractive to the large class of *soi-disant* invalids. If one regards the situation and surroundings of Nice, it is easy to see why it should have so treacherous a climate. Lying at the eastern end of a wide bay, exposed to the south, and with no near hills to shelter it, it is open to winds on every side, from the land and from the sea. It is also exposed to the full force of the sun. The nearest protecting hills are to the east and south-east, where Cape Mont Boron rises to an elevation of nearly a thousand feet, and stretches out into the sea; beyond this is the promontory of St. Jean. These would form a pretty good protection to the east were it not that there is a gap between Mont Boron and the ridge of Montalban a little north of east, and through this gap easterly winds can reach the town. To the west and north-west it is much exposed, the low-lying Cap d'Antibes offers no protection to the west, and the hills on this side are distant and of no great elevation, so that it is most imperfectly protected from the Mistral which blows from the north-west. The mountains to the north are also seven or eight miles distant, and these are not very high, the highest, Mont Chauve, being 2824 feet, so that the Tramontana, a northerly wind, also reaches Nice. There is a gap also made in the north-east by the valley of the Paillon, whose torrent flows through the centre of the town, and along this valley the bitter north-east wind finds ready access.

The meteorology of Nice has been carefully studied by many competent observers. Its mean annual temperature is 60·3 degrees Fahrenheit, nearly the same as at Pisa and Rome. Its mean winter temperature is 49·1 degrees, and its mean spring temperature 58·1 degrees.

The minimum temperature at night 26·6 degrees. The coldest months are January and February. In March there are great variations of temperature, with rough winds and clouds of dust. Falls of the barometer are almost always caused by the dry north-west wind, and rains "only cause the mercury to sink gradually and almost imperceptibly." The relative humidity for Nice is small, the annual mean at two p.m. being 59·6. The mean proportion of sunny, cloudy, and rainy days for twenty years is represented by the following figures: sunny 219·2, cloudy 77·3, rainy 67·4; and for the winter season, from October 1st to May 31st, sunny 135·8, cloudy 55·3, rainy 52·8. The mean annual rainfall is 32·43 inches, and 19·45 for the six winter months (November to April). Most rain falls, as elsewhere on the Riviera, in October and April; and the winds that bring rain are, according to some observers, the east, the south-west, and the north-east, while others maintain that the heaviest and longest rains come from the south-east. It has been calculated that for the whole year there are 83·4 days of strong wind, 258·8 of gentle wind, 22·8 of complete calm. March, April, and May are the windiest months. The east wind is the most common of the stormy winds, and blows 45 days in the year. The south-west wind is also a violent wind, especially at the time of the autumn equinoctial rains. The north-east wind sometimes brings hailstorms and snow. The Mistral blows (from north-west or west) chiefly in February and March, and is accompanied with clouds of dust. The magnificent Promenade des Anglais, one of the finest promenades in Europe, running for a mile and a half along the seashore, is especially exposed to the fury of the Mistral, as is also the adjacent quarter of the town; more protected from this and other winds is the Carabacel quarter, situated about a mile north of the shore, and somewhat under the protection of the northern hills; it is regarded as the most sheltered situation in Nice itself. Here many of the best hotels are built, and here invalids,

for whom the neighbourhood of the shore is too exciting, are advised to live. Still farther north, between two and three miles from the sea, is the suburb of Cimiez ; it is built on one of the spurs jutting out from the mountains to the back of Nice, and is regarded as having a much more sedative climate than Nice itself, and much better suited to invalids with chest complaints. It is also said to be much more sheltered from the north and other winds ; but it has appeared to other observers, as well as to myself, that Cimiez is in a very exposed situation, on the brow of a hill, certainly within reach of the Mistral and imperfectly sheltered from most winds, except the north. It of course escapes the sea winds and the stimulating saline emanations on the shore, and with its complete southern exposure must get all the advantage possible from the sunshine, without the reflection and glare from the sea.

The environs of Nice are exceedingly beautiful, especially the drives eastward, and the Corniche road from Nice to Mentone, a drive of about eighteen miles, is a marvel of beauty and interest. Short peeps only of this picturesque part of the coast are obtained from the railway as it passes through the cuttings and tunnels in the precipitous spurs of the Alps, which here approach close to the sea. Villefranche, Beaulieu, and Eza, all situated in the midst of magnificent scenery, are passed before reaching Monaco, half an hour from Nice by train. One of the most beautiful spots on the Corniche road between Nice and Monaco is the village of Turbia (*Trophæa Augusti*), at an elevation of nearly 2000 feet above the sea, built on a crest which unites Mont Agel to the magnificent bold promontory, the Tête de Chien, whose stupendous precipices tower above Monaco. A path practicable for mules and pedestrians descends to Monaco along the steep flanks of the Tête de Chien, but the carriage road has to make a long détour by the village of Roccabruna. But there is now another carriage road only just completed, which runs along the seashore

between Nice and Monaco, and I call attention to it because about a mile or so before it reaches Monaco it passes a station which as yet possesses a name and nothing more, it is absolutely in its earliest infancy; there may be one house there but not more, and others are, or were two years ago, only in course of construction. It is named after the village on the heights I have just spoken of, *Turbie-sur-Mer*. It is admirably situated in a small rock-bound bay, just a little to the west of the jutting promontory on which the castle and old town of Monaco are built. It is protected on all sides except towards the sea, and from its own natural advantages as well as from its nearness both to Nice and Monaco it is surely destined, when properly developed, to be a popular resort.

It is scarcely necessary that I should speak of the beauty and attractiveness of *Monaco* and *Monte Carlo*. If it were not for the dangerous seductions of the gaming-tables it would doubtless be one of the most popular health resorts of the whole Western Riviera, not simply because of its beauty but also because of its admirably protected situation, especially in parts. The old town and castle of Monaco are built on a curiously-shaped rock about one hundred and sixty feet high, which projects into the sea, first in a southerly and then in an easterly direction, so that it curves round towards the east in a manner so as to partially inclose its pretty little harbour. Between this rock and the promontory of Monte Carlo, which juts out into the sea about a mile farther east, extends the harbour and Bay of Monaco, with an excellent beach and sea-bathing establishment. Nearly on a level with the shore, but rising gently as it extends inwards, is a new quarter named the Condamine. The north-west portion of this quarter enjoys complete protection to the west and south-west by means of this lofty rock of old Monaco, and to the north and north-west by the high mountains which here approach to within a little distance of the sea. On the opposite side of Monte Carlo, where it

slopes down to that part of the coast which stretches away to Cap Martine and to Mentone, "the loveliest bit of the whole Riviera," there are admirable sites for villas and hotels exposed to the full sunshine, and protected on all sides except to the south and south-east, from which quarters the cold winds do not come.

Of Monte Carlo itself Dean Alford writes thus, and he cannot be suspected of any undue leaning towards a spot so completely identified with vice: "Situated on the plateau of Spelugues, which jutting into the sea about a mile to the west of the town (of Monaco), it commands a prospect of the finest portions of this beautiful coast. The frowning height of Tête de Chien shelters it from the north wind, the little Bay of Monaco lies below, with the shadows of the steep shore and quaint old town painted on its glassy surface, and eastward olive gardens and cypress groves stretch more than halfway up the sides of the mountains, which gain in height and fantastic grandeur as the view recedes. The shelving sides of the rocks are covered with delightful gardens, the space in front of the principal building is decorated with fountains and statues; and tropical plants are planted and thrive splendidly in the brilliant sunshine." It is stated that the mean annual temperature of Monaco is two degrees higher than that of Mentone, and three degrees higher than that of Nice, and as a proof of the greater mildness and equability of its climate it is also stated that during the exceptional winter of 1870-71, when at Cannes and at Nice the frost destroyed a number of plants recently acclimatised, the same plants at Monaco did not suffer at all, although in the open air and without shelter, and that the lemon-trees, which were severely injured at Mentone, were not at all affected at Monaco. If the day should ever come when the gaming-tables at Monte Carlo are suppressed, this neighbourhood will undoubtedly become most attractive as a health resort.

Mentone is but five miles east of Monaco and fifteen (by rail) from Nice. The bay, on the shores of which the town of Mentone is built, is bounded on the west by the low-lying Cap St. Martin, covered by forests of olive-trees, and on the east by the Cap de la Murtola. From cape to cape this bay is about four miles across, and has a south-easterly aspect. As at Cannes, the old town is built on a ridge which projects into the sea and divides off a portion of this bay to the east, which forms the smaller and east bay, the western division being much wider forms the west bay. This division of Mentone into an east bay and a west bay represents a very essential difference in climate; for the Mentone district is bounded, behind and on each side, by a sort of semicircle of high limestone mountains, some of them reaching an elevation of over 4000 feet, and the lowest depression or gap in which is not less than 2500 feet above the sea. The chief part of this mountain wall opposite the *western* bay is at a distance of about three miles from the town, but hills and ridges of lower elevation from 400 to 700 feet run down from it at right angles to the shore. Between these ridges, three principal valleys, with their torrents, stretch down from the higher mountains and open behind the western bay. Through these valleys currents of air descend from the north, and so produce a certain ventilation and movement of the atmosphere in this part of Mentone.

It is quite different with regard to the eastern bay. In the first place it is a much deeper indentation of the coast than the western bay, so that its curve is almost a semicircle. Then the hills come so close to the shore that there is scarcely any room for the town, which consists here of little more than a road and a row of houses and hotels squeezed in between the base of the mountains and the seashore; the mountains, however, recede a little, farther east, towards where the road ascends to the Italian frontier. Nor are there any considerable valleys

opening into the eastern bay to bring cool currents of air down from the mountains. It follows that the temperature of this bay is from 2 to 3 degrees Fahrenheit higher than that of the western bay, owing to the reflection of the sun's rays by day from the surface of the bare limestone rocks which rise directly behind it, and to the gradual giving up at night of the heat they absorb during the day. There is also less motion in the air, and Dr. Cazalis testifies that he has sometimes seen the atmosphere here absolutely still, as he has also seen it at Hyères, a very unusual thing in the Riviera. There is also said to be more humidity in the air of the east bay than that of the west. The east bay then is very sheltered and very picturesque, but it is found to have a relaxing effect on some people, who also complain of a sense of being "shut in" and confined there, and that on bright sunny days, and these often succeed one another with an almost wearying monotony, the heat and glare of the sun become really distressing.* Then there is only one level walk, and that is along the dusty high-road. But for invalids whose chief care is to lounge through the winter in a warm and comparatively still atmosphere, the east bay of Mentone is well suited; while the villas and houses built in the wider eastern part of the east bay no doubt enjoy the warmest and most protected situation in Mentone. In the western bay it is quite different; here the higher mountains fall back, as has already been said, to some distance behind the town, and the houses not only stretch along the bay, but extend, in a more or less scattered way, over the gradually sloping territory which reaches from the bay to the foot of the lower ridges

* "The eastern bay is simply a sun trap, almost intolerable all the noontide hours. Often have I sought the old town and plunged into its dark street, as into a bath, from the glare of that faint mile of great hotels and villas."—Dean Alford's "Riviera."

and the sides of their intervening valleys which come down to the north of the town. So that the west bay is not so much protected from winds as the east bay, it is more open to the south-west and to the west, and consequently gets more wind and is somewhat cooler and more bracing. The considerable differences of opinion which have been noticed to exist between the statements of different observers as to the climate of Mentone may, possibly, be accounted for by the circumstance that some have made their observations exclusively in the east bay, while others have made theirs in the west bay. For example, one writer, an old resident, states that Mentone enjoys "complete protection" from the Mistral; another says, "The western end is open to the Mistral, there being only the low Cape of St. Martin to ward it off;" a third writes, "The Mistral seldom blows here from the north-west, and even then is deprived of much of its violence and coldness, but it is still extremely disagreeable;" while a fourth actually gives the average of the number of days in which he had observed a Mistral blowing during the four winters he resided there, and these are said to be 4·5 in November, 3 in December, 4·25 in January, 6·7 in February, and 5·25 in March. He had observed it blow as many as nine days in February. The writer of this notice certainly found a Mistral blowing and raising clouds of dust in the west bay of Mentone on the evening of Christmas Day, 1880! Of other winds, the east wind is felt chiefly along the shore, and shelter from this wind can always be obtained in the walks and drives along the valleys behind the west bay. South, south-west, and south-east winds, all coming across the sea, have free access to Mentone, but these are not, as a rule, cold winds, although they may blow at times with considerable violence. From the north wind it is completely protected.

By comparing the different means of the temperature records of different observers at Mentone, the

following figures are obtained. Mean temperature for the following months :

	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.
East Bay	65·3	55·3	50·55	49·9	50·6	53·9	58·7	65·76
West Bay	62·2	55·6	50·69	49·12	49·46	51·1	57·64	63·1

It will be noticed that during the months in which there is least wind, December and January, there is scarcely any difference in the temperature of the two bays, but in the windy spring months the greater protection enjoyed by the east bay is shown by its higher temperature. The lowest temperature recorded during ten consecutive winters was 25·5 in March, 1877, and the highest 77 degrees in November, 1874. The mean daily range of temperature was found to be least in December, 9·2 degrees, and greatest in April, 12·5 degrees. The average rainfall from October to May inclusive is 25·61 inches, but if we omit October and May, for the remaining six months it is only 17·87 inches. The corresponding number of rainy days is 63·8 if we include October and May, 45·15 excluding them. January and February are the finest months, and have the smallest rainfall and the fewest rainy days. October is the wettest month. The average number of very fine days for the six winter months, from November to April inclusive, seems to be about 94·5, rather more than fifteen in each month.* Considered generally, the climate of Mentone may be taken as a favourable example of the Riviera climate, and it has the great advantage of possessing, as it were, two climates, suited to different classes of

* The discrepancies which are observed in the figures published as "means" and "averages" in the meteorological tables of different observers are, to some extent, inevitable, and depend on the circumstance that the observations recorded extend over varying periods and different seasons. Observations which extend over only five or six years will be influenced by the occurrence of one very fine or one very bad season, and will perhaps vary somewhat from the records of another observer extending over twenty or twenty-five years.

invalids. For those who especially desire warmth and shelter and a quiet indolent life, with plenty of sunshine and sun-heat, and who like to live close to the sea, there is the mild and sedative climate of the east bay, with its southern exposure and its almost complete protection from strong winds.* For those, on the other hand, who find an advantage from a more bracing air, who like to have the sun-heat tempered by cooling winds, who cannot feel at ease without "ample space and room enough" to wander free over hill and valley, or who are irritated by the monotonous beat of the tideless sea against the shore, or to whom the saline emanations from the sea prove exciting and discomfoting, for those there is the west bay with hotels and villas, some on the seashore, some a little removed from it, some, and those the newest and best, far removed from the sea and high up on the hillside. The value of a climate of this kind in many forms of pulmonary affections, in certain chronic gouty and rheumatic conditions, in states of anæmia, in convalescence from many acute diseases, and in the many infirmities to which old age is exposed, is incontestible.

But existence, even in a climate like Mentone, has its troubles. Dr. Cazalis complains of the life there being "*ennuyeuse et triste*;" of the number of sick people one encounters in bath-chairs on the Promenade du Midi, which runs along the shore of the west bay; of the number of deaths that occur in one's hotel during the winter, "*et chaque fois ce sont des scènes pénibles pour les malades qui survivent*;" and, saddest of all, "*le nombre prodigieux de Prussiens qui viennent s'y abattre et dont le contact est quelquefois désagréable. Il n'y a pas là une société d'élite propriétaire, et qui puisse faire la loi, comme celle que nous possédons à Cannes et qui ne reçoit pas les Prussiens*" (!)

There are some very beautiful walks and drives

* "There is hardly a fairer scene of languid repose to be found in all this resty land. . . . There is no edge in the breeze, no sea-air breathing from the waves."—Alford's "*Riviera*."

around Mentone, but unfortunately for invalids the walks are nearly all of them steep and fatiguing, so that, unless he is able to climb, the invalid's walks will probably be restricted to the somewhat windy Promenade du Midi. But those only who can climb up to and beyond these mountain ridges which divide the several valleys behind Mentone will discover how exceedingly beautiful the whole district is; in the background a magnificent sweep of high mountains,* remarkable for the variety and beauty of their form and the warmth and richness of their colour; in front the limitless expanse of deep blue sea, still and smooth as the surface of a mirror, or crisped into small white crests of foam by some light breeze; far in the distance the snow-clad summits of the Corsican Hills, touching the azure sky, like the ivory pinnacles of some unearthly temple; on each side, the exquisite coast scenery; towards the west, the wooded promontory of St. Martin, the picturesque village of Roccabruna, high up on the hillside; the bold precipice of the Tête de Chien, and the old tower of Turbia, above Monaco; the rocky promontory of Monaco itself, its miniature bay, the glittering towers of the Casino of Monte Carlo; and stretching out into the sea, far in the west, the ever beautiful range of the Esterels. Orange, lemon, and olive groves are spread out at our feet; and to the east there are the steep, rock-bound coast of the eastern bay and the adjacent frontier of Italy, the fine promontory of Cap Murtola, with steep red rocks behind it, and the carriage-road into Italy winding over it; and extending far out into the sea, and forming the eastern limit of the view, the sunny promontory of Bordighera. All this seen in the varied and gorgeous colouring of the setting sun, with its many hues of blue and purple and crimson and gold, composes a picture of almost unrivalled beauty.

* There is nowhere else on the shores of Europe so small a locality surrounded by mountains of an equal altitude."—Chevalier Ardoino, "*Flores des Alpes Maritimes.*"

"Those who need bracing," writes Dean Alford, "are apt to complain of a fevered and depressing effect at Mentone. On three separate occasions have I found this, and each time I have speedily lost it among the palms of Bordighera." *Bordighera* is the next health resort eastward from Mentone, from which it is distant about ten miles, being three miles from the Italian frontier town of Ventimiglia.* *Bordighera* is a conspicuous object nearly all along the Western Riviera, as it is seen glittering in the sunshine, its houses clustered together on a promontory that projects far out into the sea. It is the only health resort on this coast that occupies a position on a promontory; all the others being built round bays or depressions in the coast. It is naturally, therefore, much exposed to winds, that is to say, to all those winds that can reach it in blowing across the sea; the east, the south-east, the south-west, and the west winds can all blow freely upon this promontory. But it is well protected by mountains to the north, north-east, and north-west, whence the coldest winds come. Moreover, it is to be remembered that all the winds that reach it must, on account of its position, come to it from the sea, and impregnated with saline emanations. And this is the sole distinguishing characteristic of the climate of *Bordighera* as compared with that of neighbouring stations; the predominating influence of sea air rendering it essentially bracing and tonic. For this reason, also, its temperature is probably rather more equable—warmer in the winter and cooler in the summer—than at other places on this coast.

The old town of *Bordighera* is built partly on the promontory itself, and this commands a fine view westward of the Riviera coast, Cap Murtola, the mountains round Mentone, the Tête de Chien above Monaco, and even, on a clear day, the Esterels, west of Cannes; eastward the view is not very remarkable,

* Where a tedious delay and an examination of luggage takes place at the Italian Custom House.

the chief objects being the two capes which form the eastern and western boundary of the Bay of San Remo (Capo Nero and Capo Verde), and the little bay and village of Ospedaletti. The *new* town has been built on level ground to the west of the promontory, on each side of the main carriage-road. This plain, thickly covered with dense olive groves, stretches for a distance of three miles in the direction of Ventimiglia, and for about a quarter of a mile inland from the shore, till it reaches the base of the hills forming its eastern and north-eastern boundary. The possession of this level tract of land near the shore, and thickly covered with vegetation, gives quite a peculiar and attractive aspect to the western side of Bordighera. Dean Alford, alluding to this, says: "Bordighera has an advantage for invalids over many other resorts on the Riviera. I mean its level space of olive and lemon groves between the beach and the hills. Nowhere else can you get such delightful strolls under the dense shade of the old olives without a fatiguing climb. Should Bordighera ever come to the front, as I cannot tell why it should not, as a residence for invalids, surely this level may be made of immense use, both for building and for laying out in walks and drives." Bordighera is also celebrated for its palm groves. These give a remarkably Oriental aspect to the place. The largest groves are to the east of the promontory, but they abound on all sides. The church is "amidst a thicket of palms. The promontories on either side are outlined by the feathery tops of a hundred palms, and on looking up the gorge the wood seems full of them. These noble trees almost gird it round on the western and northern sides, and grow in profusion, of all sizes, from gnarled giants of eleven hundred years reputed age to little suckers which may be pulled by the hand and carried to England."*

Bordighera is quite in its infancy as a health resort,

* Dean Alford, "The Riviera."

and there is consequently an absence of long-continued meteorological observations from which we might form a decisive estimate as to the precise relative value of its climate. It would seem, however, from those that have been made* that it is amongst the mildest, most equable of the health resorts of the Western Riviera. The new town, by its position under the cape, is greatly protected from the east and south-east. It is well protected also from the north, and fairly so from the north-west, though the mountains in this direction are distant. But it is completely exposed to the west and to the south-west. At Bordighera the Mistral is a west wind, being turned completely in that direction by the mass of mountains behind Monaco, and from being forced to blow over the sea it loses somewhat of its dry and cold character. Bordighera naturally feels the local sea breezes, which are not strong winds, more than its neighbouring resorts, and it would seem to suffer from the stronger winds in about the same proportion as these.

Its mean temperature differs very little from that of the other resorts on this coast. For the whole winter it is the same as that of Nice, a little lower than at Cannes, still lower than at Mentone. But if we look at the different months, and if we are justified in drawing an inference from the comparatively few observations that have as yet been taken, it would appear that in January and February it is warmer at Bordighera than either at Mentone or Nice, while in November, December, March, and April it is colder at Bordighera than at either of these places. Its position on a promontory jutting out into the sea would certainly tend to make it cooler than its neighbours in the hot spring months, and would seem to point to it as a good locality for invalids to move to to escape the increased heat of this season before returning northward. Of the rainfall and number of rainy days at Bordighera it is impossible, from existing data, to speak positively;

* "Le Climat de Bordighera, par F. F. Hamilton."

it would seem to be neither better nor worse off than its neighbours in this respect. It is especially suited to invalids who want *sea* air; to cases of scrofulous phthisis in its early stages, and other cases of early phthisis without any tendency to hæmorrhage; to cases of throat and bronchial catarrhs; to cases of chronic pleurisy; of convalescence from acute diseases, cases of anæmia, and many other conditions of constitutional feebleness. Its climate is too exciting for the very nervous and sensitive. The special facility it affords for a variety of level shady walks cannot fail to make it attractive to a large class of invalids; the number of possible carriage excursions is limited by the badness of many of the roads.

As we continue eastward from Bordighera the interest and beauty of the coast scenery diminishes greatly. A drive of five or six miles along the coast, passing on the road the pretty little bay and village of *Ospedaletti*,* shut in and protected on almost all sides by its olive-clad hills, no doubt a popular health resort *of the future*, brings us to one of the most thriving of winter stations, the old Italian coast town of *San Remo*. We miss here all the fine bold and varied rocky scenery that we have left behind; the higher hills recede somewhat from the coast, and the nearer ones are wooded to their summits and present nothing particularly striking in form or colouring. Many beautiful spots no doubt lie concealed high up on these hillsides and amongst their numerous valleys, but they are not accessible to the invalid who cannot climb, unless he trust himself to the back of a donkey, which is perhaps the best thing to do. Dean Alford, evidently an enthusiastic lover of the picturesque, thus writes of San Remo: "San Remo itself is not in any sense an attractive position. The old town is indeed one of the quaintest on the Riviera, as seen from the pier below; the mountain of old houses, stained and weather-beaten, with their arched loggias and terraces,

* The development of Ospedaletti as a winter resort is now being pushed forward with great activity.

is quite unique. And when we enter the streets the scene is as curious—bands of masonry unite house to house, built as safeguard against the shaking of earthquakes. But what is all this to the invalid? There is absolutely no scenery at San Remo, unless it be sought by distant excursions. There is not even a level walk commanding a view. The prospect is shut hopelessly in by the two promontories, Capo Nero on the west and Capo Verde on the east. There is a picturesque old church, the Madonna della Guardia, on the eastern promontory, but this is almost the only object San Remo can boast. If San Remo be an excellent place for our English invalids, so far well, but other advantages it certainly has not, compared with its beautiful rivals along this exquisite coast." And no doubt San Remo is an "excellent place for invalids," and better suited to the wants of a very large class of invalids than some of the more picturesque resorts on this coast. The special recommendations of its climate seem to be that it is less exciting than some of the resorts farther west, and on that account better suited to nervous and sensitive organisations. Invalids who cannot sleep at Nice and Cannes can sleep at San Remo. Its temperature records, compared with those of the other health resorts on this coast, show it to be as warm in winter as the warmest of them, somewhat more equable, with less difference between day and night temperature, and less difference between summer and winter temperature. Owing to the greater equability of its temperature, visitors can remain later on at San Remo without feeling the weather unpleasantly hot and relaxing as in some other of the towns in the Riviera. The Italians use it in the summer as a sea-bathing station. It is exceedingly well protected by a triple barrier of mountains from northerly winds which blow over the town and are only felt far out at sea. The east wind is the strongest and most felt here owing to the low elevation of Capo Verde and the absence of any other protection in this quarter. This and the south-

east are the prevailing winds. The north-east blows occasionally in winter, and it is a biting cold wind. The Mistral, too, is felt here, and some observers state that it is more felt here than at Mentone. San Remo has a clay soil, and on that account it is somewhat damp after heavy rains, but this is looked upon as not altogether a disadvantage, as it tends to render the air less dry and irritating. The rainfall at San Remo and the number of rainy days during the winter season appear to be less than at almost any other resort on this coast.

The accommodation provided for visitors at San Remo is good; the hotels are numerous and well managed; there are plenty of shops, and there is an Italian Opera. It is not well off for drives, and the excursions into the mountains and neighbouring valleys are difficult, not so much on account of the steepness of the ascent as from the absence of paths. As to the class of invalids likely to be benefited by San Remo, it is unnecessary to recapitulate what has already been said with respect to other health resorts on the Riviera. San Remo is adapted to the same class of cases with this distinction, that its climate is rather less bracing and more soothing than some of the other stations, and therefore better adapted to nervous and sensitive constitutions. There are some invalids who have a sort of sentimental preference for Italy over France. They feel happier if they can say, "Now we are in Italy," and this has probably had something to say to the rapid growth of San Remo as a winter resort. The large German colony here may also find Italy more comfortable as a residence than France.

There remain but two other towns on the western Riviera that can be spoken of as in any sense winter health resorts. They are Alassio and Pegli.

Dean Alford asked why *Alassio* had "never been praised as a spot of shelter for English invalids?" Since this question was asked, Alassio has been "taken up," and its merits as a health resort have

begun to be made known. It is about twenty-eight miles east of San Remo, and is best reached from the north by the line from Turin to Savona, the latter town being about twenty miles east of Alassio. Alassio is situated in a lovely bay, having a south-eastern aspect well protected between two headlands, Capo delle Male on the west, and Capo di Santa Croce on the east. It is also well protected by encircling hills to the north, at no great distance from the shore. It possesses an excellent beach of fine sand, and is popular with the Italians on that account as a summer bathing place. The Riviera scenery again becomes very beautiful at Alassio. The fine hills behind the town are covered with olive-trees, and there are many sheltered nooks for villas as well as admirable picturesque walks and drives in the neighbourhood. Some of the views are remarkably beautiful and interesting, especially one looking west over the bay, and that of the curious island of Gallinaria just outside the bay to the east.

Meteorological observations of a thoroughly reliable kind are not yet available. It is probably not so warm as San Remo, as it is rather more open to the north-east winds, and the northern hills not being so high the north wind (Tramontana) reaches a portion of the district close to the shore. But more trustworthy weather statistics will no doubt be soon forthcoming, and it will be time enough then to pronounce precisely on the relative merits of Alassio as a winter resort for invalids. That it is an exceedingly picturesque and beautiful winter residence may be confidently stated. Hotels are springing up rapidly, and it will no doubt soon follow the example of San Remo and develop into a popular Riviera health resort.

Pegli is really a suburb of Genoa, from which it is distant only half an hour by rail. But it is very much warmer than at Genoa, as it enjoys a purely local protection from cold winds by means of hills to the north as well as to the east and west. It is a

little fishing and ship-building town, situated along the seashore looking south, and celebrated for the presence of some very beautiful gardens, belonging to the palaces of native noblemen, especially those of the Villa Pallavicini. It differs, no doubt, considerably in its climate from the resorts at the western extremity of the Riviera di Ponente; but there are no available meteorological tables for purposes of comparison. The humidity of the air, for one thing, is much greater, and those who have found the air of Mentone unpleasantly dry and irritating have improved much at Pegli. It has acquired a reputation for benefiting asthmatic cases, which, as a rule, do not do well (if spasmodic) on the Riviera generally.

In the foregoing brief sketch of the principal health resorts on the Western Riviera I have endeavoured, from the results of personal observation and from comparison of various authorities, to point out in as concise a manner as possible the chief characteristics of climate and situation of those several stations. I would repeat, by way of conclusion, that the climate of the Riviera is by no means a perfect one. But if it has cold winds and at times blinding dust, and if the air in places is exceedingly dry and irritating, it has also an immense proportion of fine days, clear skies and bright sunshine, when from nine in the morning until three in the afternoon an invalid can live in the open air. "The warm southern sun and the azure sky of the Mediterranean, far more than elevated temperature, constitute the advantages of this climate; fine weather rather than heat is what is here sought for," and, let me say, is usually found. But if the Western Riviera has its drawbacks—and what climate has not?—it must be admitted that the number of localities which we here have to choose from gives us an opportunity of selection impossible to find elsewhere. And then it is a region of almost unrivalled beauty. A very eminent and greatly occupied London doctor was found one Christmas looking very pleased and happy on this coast. "What

brings you here?" inquired a wondering friend. "I am here for three or four days' holiday." "But is it possible that it can be worth your while to come so far for so short a time?" The doctor turned round to his friend, and, waving his hand seaward, replied: "How do I know I shall ever see such a day as this again!" And he stood on the shore of a beautiful bay, from the margin of which the blue water stretched far, far away; behind him rose range after range of encircling hills, terminating finally in the snowy summits of the distant Alps. On each side steep wooded promontories, jutting out from the mountains behind, planted their feet in the blue sea, and in a cloudless sky, shining majestically over all, the source of all its beauty was that "grand arbitre des santés humaines, Monseigneur le Soleil!"

THE END.

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